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ABSTRACT

This handbook is intended to help teachers of pre-employment shop courses in organizing and delivering instruction in both the shop and classroom. Addressed in the guide are the following topics: the instructor's place in the local school organization; the instructor's job (objectives, advisory committees, occupational analysis, shop/classroom and personnel organization, rules and regulations, accident prevention, and requisitions); preparation for teaching (preliminary meetings and conferences, shop organization, objectives and lesson plans, shop management, and learning activities); and teaching plans and devices (stages in teaching, teaching tools, discipline management, classroom routine, plans for work, teaching activity, and records and reports). Appendixes to this guide include a 13-item bibliography, simple inventory system for materials and supplies, information about local multiple-list textbook committees, criteria for selecting textbooks for vocational industrial education, suggestions for teaching with an overhead projector, recommendations for film users, information on management and the accident liability of shop teachers, a discussion of student leadership responsibility, an instructor's check sheet, qualities of a good shop teacher, standards for eye protection in public schools in Texas, and a discussion of first aid and the law. (MN)

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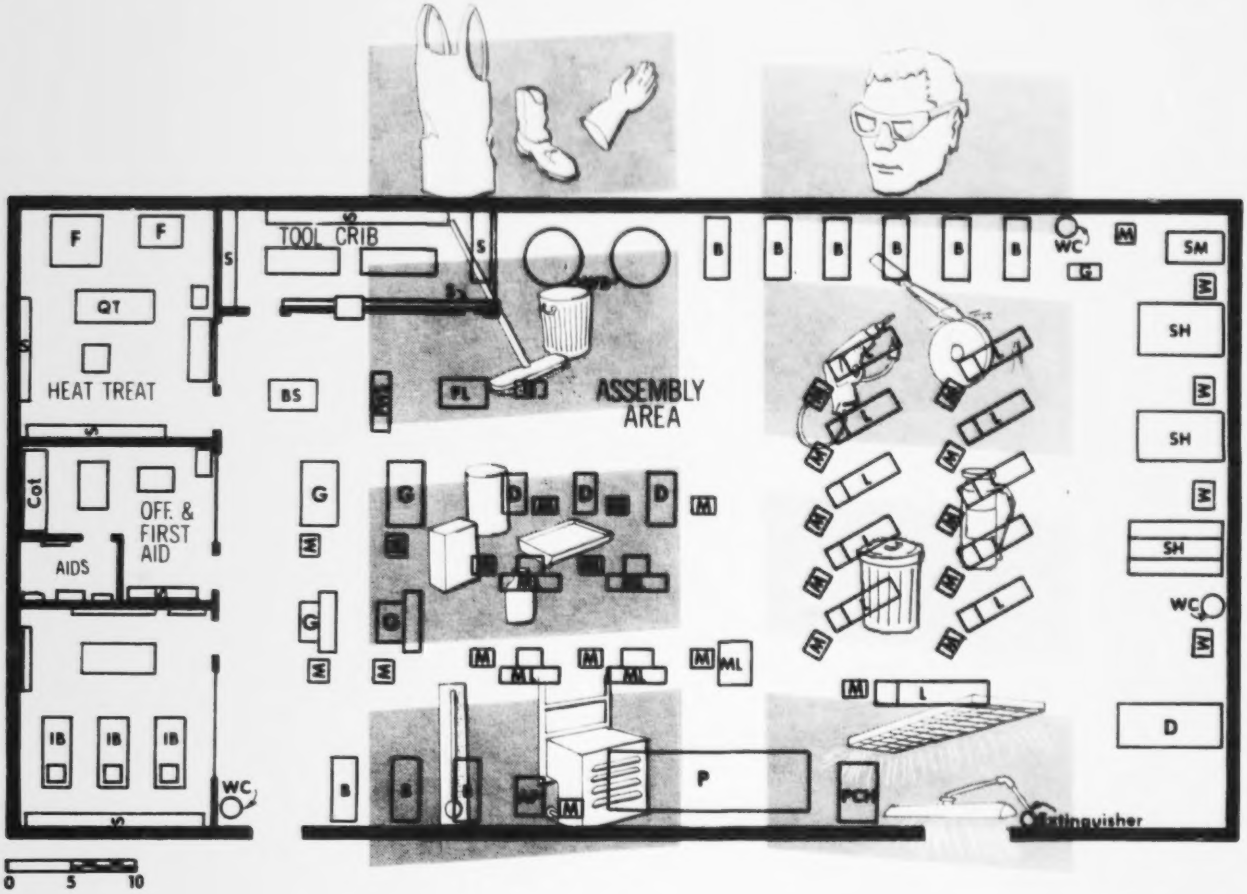

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PREFACE

This handbook is intended as a source of reference on matters pertaining to requirements, standards, objectives, and procedures for organization and management of pre-employment shop and classroom programs. The following definitions are for the new teacher to become acquainted with the vocational programs offered in the public schools, and to differentiate between general education and vocational education.

General Education Program - A secondary school, junior college, or adult education program of studies designed primarily to assist pupils with the common activities of citizenship, work, and family life through a variety of electives. This is contrasted with specialized education which prepares for an occupation.

Vocational Education - Vocational or technical training or retraining which is given in schools or classes (including field or laboratory work and remedial or related academic and technical instruction incidental thereto) under public supervision and control or under contract with a state board or local educational agency, and is conducted as part of a program designed to prepare individuals for gainful employment as semiskilled or skilled workers or technicians or subprofessionals in recognized occupations and in new and emerging occupations; assist students in making informed and meaningful occupational choices; prepare students for paid or unpaid employment; or provide preparation for enrollment in an occupational program at a higher secondary or post-secondary level.

Trade and Industrial Education - Has the purpose of developing basic manipulative skills, safety judgments, proper work habits, desirable attitudes, and appreciations for the purpose of fitting young persons for initial employment in industrial occupations and upgrading or retraining workers employed in industry.

Trade and Industrial Education Pre-Employment Laboratory - Training is provided through practical shop and/or laboratory experiences and other related school activities. The local school provides the shops or laboratories, tools, equipment, and materials which are comparable to those used in industry. Each student enrolled receives one, two, or three hours of instruction each day which is centered around the performance of useful or productive jobs and activities and taught by a teacher who is experienced and competent in the occupation which he or she teaches.

Coordinated Vocational - Academic Education (CVAE) programs are limited to students identified as academically disadvantaged. A student who is one or more years below grade level in achievement in three or more academic classes, or if the composite score on a standardized test indicates below grade level, is considered academically disadvantaged.

Coordinated Vocational - Academic Education Pre-laboratory - Training is provided in clusters of trades. Pre-employment shop is scheduled for a minimum of two consecutive hours (110 minutes) each school day, and students are enrolled in modified academic and other courses during the remaining portion of the school day. This type of class is normally utilized during the junior high and early high school years, having the objectives of assisting enrollees to be employable as well as prepare them for entry into cooperative type programs or regular vocational programs later in their scholastic career.

Pre-Vocational Education Classes are one hour classes that may be taught by any certified vocational education teacher as a part of any allocated vocational teacher unit. Pre-vocational classes may be offered for a full year in an occupational cluster or specific occupational area, or up to six different occupational areas in one year.

Vocational Education for the Handicapped (VEH) programs are limited to handicapped students who cannot succeed in regular vocational education programs without modifications, special supplementary aids, or services, and are placed in vocational education programs through the Admission, Review, and Dismissal (ARD) Committee, which consists of a vocational administrator.

FOREWORD

The handbook for Pre-Employment Laboratory Teachers emphasizes, in brief form, that information which is helpful and important to the teachers of pre-employment shop courses.

The purpose of this book is to help teachers of pre-employment shop courses to organize course content and materials, plant facilities, machines, and equipment and in addition, to assist them in formulating ways and means to manage and organize planned instruction of students in the shop and classroom.

Specific information may be found on the many topics presented in this handbook in various publications concerning vocational education. A bibliography has been included for those who desire to further explore certain subjects condensed in this publication.

Specific emphasis or assistance concerning topics may be gained by requesting the assistance and services of the Vocational Industrial Teacher Educators.

ACKNOWLEDGEMENT

Appreciation is extended to those individuals who contributed their time and talents in the planning, development, and review of The Handbook for Trade and Industrial teachers.

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Special thanks are extended to Dr. Gene Hix, Editor; Mike Harrison and Frances DeGelia, Illustrators; and the printing staff for their time and efforts in the illustrating, editing, and printing of this publication.

Brand names, company names, trademarks, or other identifying symbols appearing in the publication are used to clarify and identify and does not constitute a recommendations or endorsement.

To ensure educational equity, the material has been reviewed to eliminate bias or stereotyping.

TABLE OF CONTENTS

PREFACE

FOREWORD

CHAPTER I: The Instructor's Place in the Local School Organization.....1

CHAPTER II: The Instructor's Job.....3

Analysis of the Vocational Industrial Teacher's Job.....3
Objectives of Pre-Employment Shop Classes.....5
Advisory Committees..... 5
Analyzing Occupation Into "Do" and "Know" Elements..... 6
Simplified Analysis..... 7
Care and Maintenance of Machines, Tools and Equipment..... 8
Shop-Class Organization..... 9
Personnel Organization.....9
Shop Rules and Regulations..... 11
Accident Preventing and Reporting..... 12
Arrangement of Tools..... 12
Materials and Supplies..... 14
Charging for Materials..... 14
Requisitioning Supplies..... 16

CHAPTER III: Preparing To Teach..... 19

Preliminary Meeting and Conferences..... 19
Understanding the School System..... 19
Examining the Equipment..... 20
Shop Organization..... 20
Organizing the Shop..... 20
Determining Instructional Objectives..... 21
The Course of Study..... 22
Lesson Plans..... 22
Lesson Plan..... 23
Arranging Jobs in a Learning Order..... 27
Shop Management..... 28
Managing Student Activities During Shop Session..... 28

CHAPTER IV: Teaching Plans and Devices..... 31

Stages in Teaching..... 31
Teaching Tools..... 37
Discipline Management..... 46
Class Routine..... 51
Planning the Work..... 51
Teaching Activity..... 52
Records and Reports..... 56

APPENDIX.. 61

Bibliography.. 63
A Simple Inventory System for Materials and Supplies....... 80
Local Multiple List Textbook Committees.................. 81
Selection of Textbooks for Vocational Industrial Education.. 81
Suggestions for Teaching With the Overhead Projector...... 82
Ten Recommendations for Film Users....................... 84
Management.. 89
Student Leadership Responsibility........................ 89
Accident Liability of Shop Teachers...................... 92
Instructor's Check Sheet................................. 104
A Good Shop Teacher...................................... 104
A Bill to be Entitled.................................... 109
Standards for Eye Protection in Public Schools........... 110
First Aid and the Law.................................... 125

INDEX.. 140

LIST OF ILLUSTRATIONS

Figure Page

1 Skilled Person to Teacher.... 1

2 The Teacher's Place in the Local School Organizational Pattern.... 2

3 Decorate Iron Door to Resemble Oxidized Copper.... 6

4 Column Headings for Simplified Analysis.... 7

5 Care and Maintenance of Machines, Tools and Equipment.... 8

6 Shop-Class Organization.... 9

7 Leadership Responsibility Wheel.... 10

8 Work Chart.... 11

9 Accident Prevention and Reporting.... 12

10 Arrangement of Tools.... 13

11 Arrangement of Tools.... 13

12 Tool Check Form.... 13

13 Materials and Supplies.... 14

14 Charging for Material.... 15

15 Receipt for Materials.... 15

16 Lumber Record.... 16

17 Continuous Inventory Form.... 16

18 Stock Bins Equipped for Keeping Continuous Inventory.... 17

19 Organizing the Shop.... 21

20 Determining Instructional Objectives.... 21

21 Course of Study.... 22

22 Organize Lesson Plans.... 24

23 Step by Step.... 25

24 Planning the Instruction.... 26

25 Communications.... 29

26 Preparation of Lesson Plans.... 31

27 Preparation Stage.... 32

28 Presentation Stage.... 32

29 Application Stage.... 34

30 Evaluation Stage.... 35

31 Summary Stage.... 36

32 Teaching.... 39

33 Use of Questions.......... 39
34 Steps in Questioning.......... 40
35 Questions Should Be.......... 40
36 Showing and Illustrating.......... 41
37 The Use of Charts and Diagrams.......... 42
38 Training Aids.......... 42
39 Teaching by Demonstration.......... 43
40 Student Achievement.......... 44
41 Student Credit.......... 45
42 Discipline.......... 47
43 Safety.......... 48
44 Safety.......... 48
45 Test or Evaluation.......... 55
46 Ways of Measuring Learner's Progress.......... 58
47 Fair, Firm and Friendly.......... 59
48 The Five Stage Lesson.......... 65
49 How to Use the Five Stage Lesson Plan.......... 66
50 Instructor's Plan for Informational Lesson.......... 67
51 Instructor's Plan for Performance Lesson.......... 71
52 Job Sheet.......... 75
53 Job Sheet, Example.......... 76
54 Task Sheet.......... 77
55 Progress Chart.......... 78
56 Progress Chart, Example.......... 79
57 Student Record Certificate on Safety Instruction.......... 94
58 Student Safety Statement Form.......... 96
59 Parental Permit to Operate Machinery and Safety Pledge.... 97
60 Safety in Relation to Performance.......... 98
61 Safety Supervisor's Check Sheet.......... 99
62 Shop Inspection Report.......... 100
63 Student's Private Physician Card.......... 101
64 Preliminary Accident Report.......... 102
65 Accident Report.......... 103
66 Arrangement of Tools.......... 131
67 Arrangement of Tools.......... 131
68 Arrangement of Tools.......... 132

69 Arrangement of Tools.................................... 132
70 Arrangement of Tools.................................... 133
71 Arrangement of Tools.................................... 133
72 Arrangement of Tools.................................... 134
73 Arrangement of Tools.................................... 134
74 Toolroom.. 135
75 Arrangement of Tools.................................... 135
76 Arrangement of Tools.................................... 135
77 Storage Space for Student's Work and Clothing........... 136
78 Arrangement of Tools.................................... 136
79 Job Plan Sheet.. 137
80 Competency Profile Sample............................... 139

CHAPTER 1

THE INSTRUCTOR'S PLACE IN THE LOCAL SCHOOL ORGANIZATION

Selection to serve as a teacher of a trade and industrial course is a high tribute to a person's reputation as a craftsperson. The pre-employment shop teacher will have more intimate and closer contact with students than any other member of the school faculty. Consequently, this person will have a greater influence on the character, attitude and habits of the students. (Figure 1)

The trade and industrial program is an integral part of the local public school curriculum. (Figure 2) It is made available to the students and financed like other subjects offered in the school's program of studies. The pre-employment shop teacher will be responsible to the school administration for the quality and kind of shop training given in the school, and for the placement of students in industrial jobs. There should be a conscience effort at all times to include development of character in addition to training in the skills and related information of the occupation.

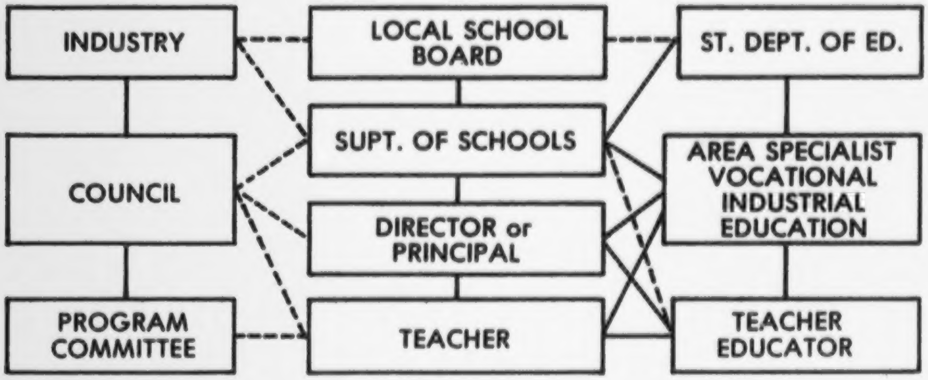
Figure 1

Management of the school is the responsibility of the principal or director, to whom the instructor is directly responsible. Matters concerning the operation and administration of a program should be carried to the immediate administrator, director principal, or superintendent. It is considered unethical to carry problems to members of the school board. Proper lines of authority should be learned and followed.

The transition from tradesperson to teacher is not easy and becomes increasingly difficult as vocational industrial pursuits become more technical. It is necessary for the tradesperson to learn the procedures of a new occupation - teaching - in addition to keeping informed on new developments, materials, and techniques of the occupation.

Area specialist and vocational industrial teacher educators are available to advise pre-employment shop teachers. These two groups have a responsibility to the State Education Agency, Trade and Industrial Education Program, for the quality of the programs in the shops. Area specialists and teacher educators visit many schools throughout the state. They have a clear-cut concept of the manner in which a shop should operate. Teachers should feel free to request, through the proper channels, the services of area specialists and teacher educators to assist in instructional areas that will improve their programs.

While under the teacher's supervision, the behavior of students is the teacher's responsibility. This new relationship may demand contact with the parents of students and imposes a social responsibility of great importance. The character of the instructor will have a lasting effect upon the minds of impressionable youth. One should never offend by reference to unfortunate family circumstances or inferring ignorance on the part of any student. Instructors should strive to be benefactors, thereby making their influence felt in a sphere of activity much wider than the shop or classroom.



THE TEACHER'S PLACE IN THE LOCAL SCHOOL ORGANIZATIONAL PATTERN

Lines of Authority
------------------Advisory Function
__________________Working Relationship

Figure 2

CHAPTER 2

THE INSTRUCTOR'S JOB

A person's job as a pre-employment shop teacher involves what is known as the Teaching Process. To insure success and conserve time and effort, careful planning, intelligent organization, and approved teaching methods should be employed. A new occupation has been entered, and there are new skills that must be mastered if a good teaching job is to be done.

ANALYSIS OF THE VOCATIONAL INDUSTRIAL TEACHER'S JOB

The particular activities and mental equipment of the trade and industrial teacher are set forth in the following outline:

WHAT A TEACHER DOES	WHAT A TEACHER MUST KNOW
I. Prepare instruction	
A. Analyzes the occupation or assists supervisor in same.	Personal trade. Analysis techniques.
B. Organizes analysis content into teaching units (lessons, tasks, assignments, competency profiles, etc.)	Principles of vocational training. Objectives of the teaching program.
C. Arranges lessons in teaching sequency.	The general instruction situation. How a learner learns. Nature of a lesson.
D. Prepares teaching plan.	The five stages, pattern of instruction. Methods of instruction.
E. Prepares instruction sheets.	Nature of performance learning. Nature of informational learning.
F. Prepares teaching aids.	Difficulties in learning. Kinds of effective teaching aids.
G. Revises instruction as it seems advisable.	Changes in industrial processes, and new processes.
II. Conducting Instruction	
A. Teaches individuals.	Individual differences in learning.

	B. Teaches groups.	Human traits and aptitudes.
	C. Evaluates learner accomplishments.	Kinds of tests. Methods of rating. Use of progress chart. Urges in human behavior.
III.	Managing Instruction Situation	
	A. Plans and organizes instruction shop.	Principles of shop layout.
	B. Cares for shop and supplies.	Codes regarding safety. Proper physical conditions of shop and equipment.
	C. Requisitions. Materials and supplies.	Technique of preparing requisitions. Where materials and equipment may be obtained, and their cost. What materials and equipment are needed?
	D. Keeps running inventory of supplies.	Inventory techniques.
	E. Keeps records.	Policy and practices of institution where employed.
	F. Makes reports.	Relationship of teacher to supervisor and associates. Purpose of reports.
IV.	Final Functioning of Instruction	
	A. Appraises aptitude and ability of learners.	Meaning of aptitude and ability. Principles of guidance.
	B. Maintains occupational contacts.	Industries of community. Social and economic conditions of community.
	C. Recommends trainee for employment.	Employment opportunities. Employment agencies.
	D. Follows up on progress of trainees.	Where to locate former students. Other training agencies.
V.	Improving Self Professionally	
	A. Reads trade and educational literature.	Existing professional publications.
	B. Takes professional improvement courses.	Certification requirements.

C. Reviews trade experience.	Where to receive additional experiences. Available training courses.
D. Joins teacher's organizations.	Code of professional ethics. How to contribute to professional organizations. What the teacher can do for the organization.[1]

In addition to the Teaching Process, the job involves the guidance, placement, follow-up of students, plus the public relations for the program. Favorable publicity may be obtained with industry and the general public through the sponsorship and operation of an appropriate student leadership club.

OBJECTIVES OF PRE-EMPLOYMENT SHOP CLASSES

Instructors must understand the objective or intent of their instruction. Just as it is important to know where one wants to go when commencing a trip, one must know the goals when starting a teaching job. It is important to know how to reach a destination when traveling; likewise, the how is important in teaching. One purpose of this handbook is to provide the how of teaching. The individual interested in becoming thoroughly adjusted will investigate the Vocational Industrial Certification Courses as a means of developing and perfecting additional teaching skills.

All programs must be REALISTIC in the light of local and area manpower requirements and job opportunities; SUITED to the needs, interests, and abilities of students to benefit from the program in which they are enrolled so that they may acquire the knowledge and skills necessary for them to (1) make informed and meaningful occupational choices, (2) enroll in advanced technical education programs, and/or (3) become successfully employed in the occupations for which they are trained.

All programs must be EFFECTIVE regarding the placement and successful employment of students in the occupation for which they were trained, or in closely related occupations.

ADVISORY COMMITTEES

Employer and employee groups have a vital interest in the Vocational Industrial Program. Since they know from firsthand experience the training needs of the local community, it is recommended that the advice and counsel of these groups be solicited. Their opinions are especially valuable in connection with student counseling, content of course, selection of instructors, suitable equipment, and standard practices in the occupational field. The advisory committee is composed of equal numbers of local employers and employees representing the trades for which preparatory training is given and is referred to as a "Program Advisory Committee." Advisory committees have been found to be very helpful in assuring effective training program whose graduates are employable.

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[1] B.M. Hackney, Fundamental Principles for Planning and Teaching, Engineering Extension Service, Texas A&M University, pp. 4-6.

Since an advisory committee is required, it is recommended that the help of the area specialist be enlisted to supply the details on the techniques of appointing and using this committee. For additional information on the advisory committee the publication: King, Sam W., Organization and Effective Use of Advisory Committees, is available from Vocational Instructional Services, Vocational Industrial Education, F.E. Box 182, Texas A&M University, College Station, Texas 77843.

ANALYZING OCCUPATIONS INTO "DO" AND "KNOW" ELEMENTS

All occupations may be broken down into what the learner must do and know in order to successfully perform the tasks involved. This sounds very simple, but skilled workers do certain tasks so mechanically that some movements border on the sleight of hand. It is difficult for the skilled person to include, for the green learner, all of the skills and information learned through long experience. Therefore, it is necessary to analyze occupations into do and know items of performance.

Many occupations are not easily taught in their natural form due to length, multiple skills, and complexity. Different jobs frequently include some of the same basic tasks; for example, in the automotive trade, to remove and replace the drive shaft may be a basic task involved in repacking universal joints or several jobs relating to the transmission. For any job in the cosmetology occupation the patron must be prepared, and most jobs on the hair are preceded by a shampoo. The machinist finds that a piece of stock must be chucked and centered before any job on the lathe can be done. Once taught, basic tasks may be used in the next teaching job in which they are involved.

Each task to be taught must be analyzed into do and know elements by first listing the task steps in the do column and the information in the know column. An example is illustrated in Figure 3.

DECORATE IRON DOOR TO RESEMBLE OXIDIZED COPPER DO	 KNOW
STEPS	HOW
1. Remove loose scale.	1. Methods of preparing metal surfaces for oxidizing.
2. Apply one or two ground coats.	2. Kinds of paint to use.
3. Apply coat of Verdegris green.	3. Color and number of coats of ground to use.
4. Wipe to desired effect.	4. Methods of preparing Verdegris green stain.
5. Varnish with Spar Varnish.	5. Proper consistency of stains to be applied.
	6. Need for using rubber gloves.

Figure 3

It is necessary for the new teacher to analyze all tasks that are to be taught. All material must be taught at a pace that will insure that every member of the group understands what must be done and what must be known to prepare a task. This "taking apart" of each task enables the teacher to plan lessons and to carry out the teaching assignment. The simplified analysis illustrated in Figure 4 will identify some additional teaching content that may be overlooked by a beginning teacher.

Additional information on analysis can be found in Standards and Formats for Industrial Instructional Materials, Texas A&M University, Vocational Instructional Services, F.E. Box 182, College STation, Texas 77843.

SIMPLIFIED ANALYSIS

Since many analyses have been made in the past, the need has lessened for making a complete trade analysis before beginning to teach. Teachers should organize their material in the best learning order. The following shortcut analysis procedure is suggested.

A large sheet of wrapping paper, about 36" long and 24" to 36" wide, should be used to place the six column headings shown below. It will be noted that these six headings actually are for the listing of the do and know elements for the analysis of the trade which the instructor will teach. When column heads have been set up, a complete list of items should be made. Under certain conditions several instructors may work as a committee in order that an exhaustive list may be developed rapidly.

COLUMN HEADINGS FOR SIMPLIFIED ANALYSIS

DO			KNOW		
Major Block	Tools and Equipment	Equipment and Tool Skill	Trade Inf.	Science, Math Blueprint Reading	Technical Information

Figure 4

Example of a major block within the trade would be such items as "brakes", "engine" or "chassis" in automechanics. In the machinist trade each of the machines will representa major block. Major blocks of cosmetology will be represented by the parts of the body that the operator will be working on such as, "hair", "skin" and "nails"; also "wigs" are considered a major block. Use of the major block column halps to organize one's thinking and directs attention to specific areas within the trade. When completed, this analysis will be found invaluable in planning the course outline and working toward a course of study.

After doing a course analysis, the instructor should make certain that all of the essential elements for that program are included in the statement of objectives for the course. Similarly, the instructor should include in the aims of the instructions a listing of all competencies for the trade in which the instruction is being conducted.

In some states an adopted listing of essential elements for programs have been developed and published by the educational agency. Schools that offer courses for these programs must include these essential elements. In programs where there are no essential elements developed, the instructor should develop them for that program.

A listing of competencies should be compiled identifying those skills and concepts the student will be taught and what degree of competence should be achieved. This listing can be developed into a folder form to become a permanent record for that student. Presently, some state educational agencies have developed competency profile folders for vocational education programs.

Vocational Instructional Services, Texas A&M University, F.E. Box 182, College Station, Texas 77843 has completed basic course outlines, competency profiles, and course of studies for a number of occupational trades. For additional information it is suggested that you contact the Vocationa Instructional Services.

CARE AND MAINTENANCE OF MACHINES, TOOLS, AND EQUIPMENT

The instructor has responsibility for the care and cleanliness of the school shop. There are those who believe the efficiency of an instructor can be accurately judged by the appearance of the school shop. Visitors entering the shop after hours may tell by the manner in which tools, materials, and other items have been left whether or not the teacher is neat or slovenly, organized or careless, systematic or shiftless, energetic or lazy. Clean, painted, and maintained surroundings help to develop positive student attitudes, pride in work, and pride in care of tools, machines, and equipment. Figure 5 is an illustrated example of properly operating equipment, clean surroundings, and student organization.

The shop instructor, in addition to teaching a regular class, is expected to keep the machines, tools, and equipment, instruments and all other devices needed for effective instruction in a state of good repair. This requires a systematic program of preventive maintainance that should be an integral part of the course of study.

Facilities required to operate a vocational industrial program represent a sizeable investment. A planned program for replacement as they wear out shoud be worked out with the school authorities. The annual operating bud-

Figure 5

get should include funds for replacement and maintenance if the facilities and equipment are to be maintained.

Using students to keep equipment in repair does not relieve the instructor of the responsibility for the periodic check-up and maintenance of equipment. It is up to the instructor to determine when repairs should be made to a machine. If the machine is used in daily teaching, the instructor should use the same reasoning that would be used in industry when a machine needed in daily production breaks down. If it requires an immediate after-hours assignment or Saturday work to get the machine back in shape, a good instructor will do the job.

SHOP-CLASS ORGANIZATION

Since productive work is used in the school shop as a means of learning, it is very important that shop classes be carefully organized and that the organization function according to plan. Related information lessons are scheduled and taught to the class or to individuals or small groups with the need determined by shop activities. In operating the shop class, the instructor assumes one of two roles: that of "class general manager" or "shop superintendent."

Personnel Organization

Figure 6

Some shop programs have students on several levels of progress within the program. Where this is true, the class should be divided into progression levels, and the advanced students may be assigned as supervisors to take the beginning groups through their assignments.

If the group is from one grade only, the most competent will soon show themselves by the quality and quantity of work produced. These more apt students may be used to assist other less skillful students as the pattern of individual differences appears in the shop.

The shop instructor must define the duties and responsibilities of the supervisors allowing them to handle groups. Machinery hazards are always the responsibility of the instructor. The instructor must never feel that this responsibility can be delegated to another person, regardless of whether student supervisors or paid assistants are used. The teacher must exercise care. Safety must be taught at the proper time to each student over whom the instructor has direction.

The supervisors should receive all general instructions concerning the job from the teacher, and should be held responsible for tools and materials used by students. It is the supervisor's responsibility to keep the group at work.

The student group should learn to take orders and work together as a unit. Group size should be small, probably not to exceed four students. Supervisors may be rotated from time to time. However, they should remain with a group long enough to become acquainted with each member and to establish unity.

Some pre-employment teachers have been successful using an elaborate shop organization structure. A typical organization consists of a shop superintendent, supervisors, safety inspector, recording clerk, and stock and toolroom manager. Specific duties are assigned for each job, and students draw specific assignments on the basis of rotation. (See Appendix pp.88)

In any event, it is good teaching to enlist the help of the students and assign, on a rotation basis, the various leadership responsibilities to each class member. A chart as illustrated on Figure 7, showing the assignment of each leadership responsibility, will be helpful with student management problems.

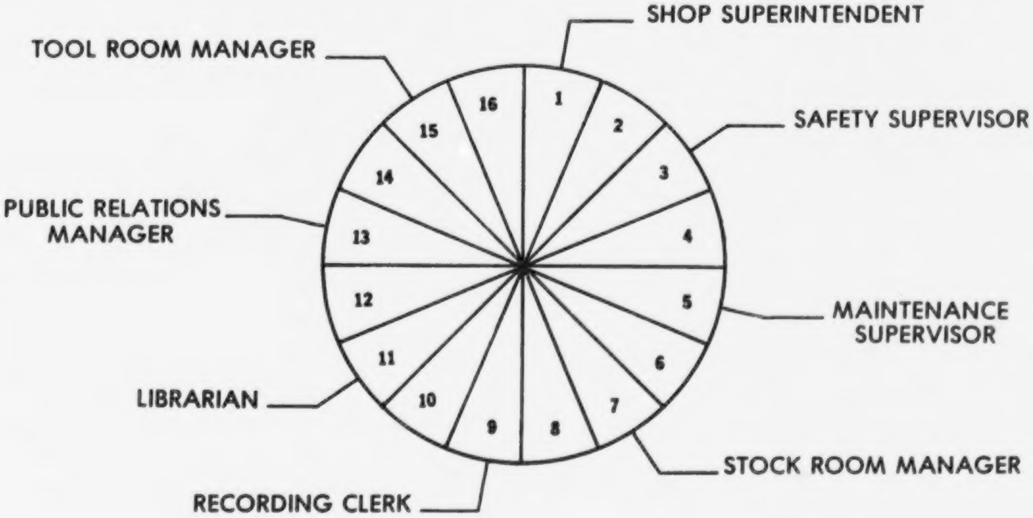
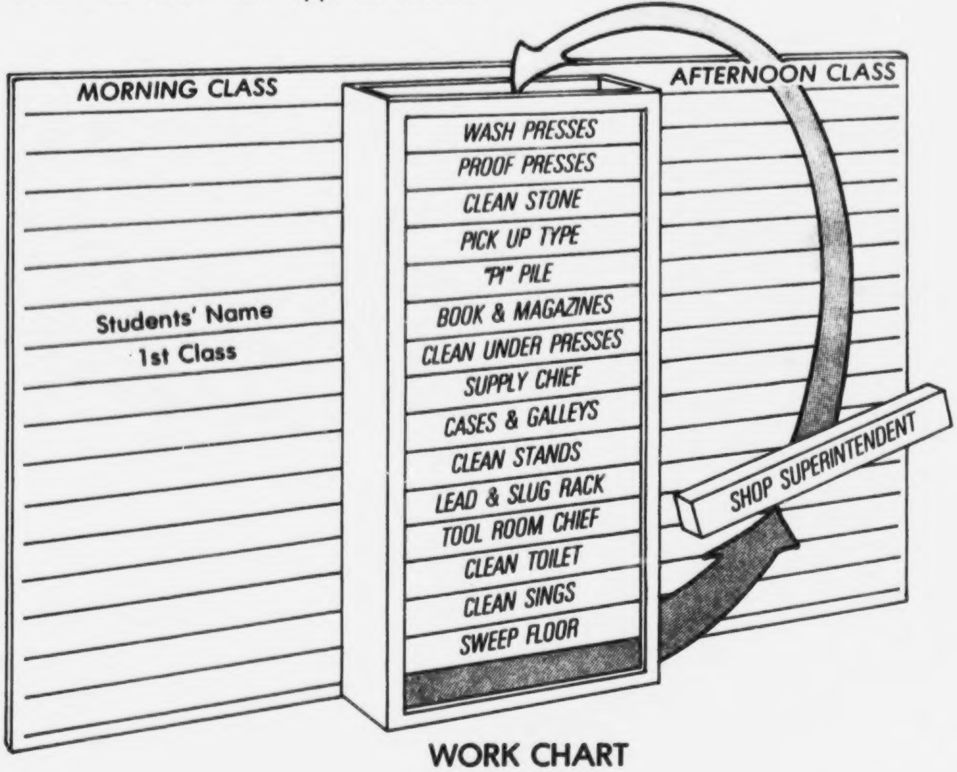


Figure 7

Duties that apply to each of the leadership responsibilities listed on the Leadership Responsibility Wheel may be found in the Appendix, pages 88-91.

When cleaning the shop, students should be required to do all that the worker in the occupation would do towards keeping bench tops and machines clean and tidy. Keeping the shop floor clean has value as part of the over-all training of housekeeping. Work of this type should be equitably distributed among members of the group, and the instructor will devise techniques that will insure an even distribution of this work load. A chart showing the order, sequence, and time each individual is to serve will be helpful to both students and instructor. Illustrated in Figure 8 is such a chart for a print shop. The students are given numbers on a separate sheet. These assignment blocks are changed each week, and students are rotated through assignments on the work chart. This system of shop organization is one of the best vehicles for providing students with experiences that will assist in the development of desirable attitudes and appreciations.



WORK CHART

Figure 8

Students should be utilized to do as much as possible in caring for equipment. There is valuable training in the repair and maintenance of tools, equipment and machinery. All tools and equipment should be check at the close of each shop period. No class should be dismissed without the instructor's final inspection to see that every item is in place and that damage or breakage is properly accounted for and reported. Students with special abilities and aptitudes will progress faster than the group as a whole. Repair jobs that have good instructional value may be assigned to the better-qualified students, if the proposed maintenance fits into the instructional program.

SHOP RULES AND REGULATIONS

One of the first duties of each instructor is to become familiar with the organization in which they are working and to understand its policies and practices. There is a responsibility to students to help them understand and interpret such rules and regulations that they are expected to observe.

It is unwise to have too many rules and regulations for shop conduct. Too often this places negative emphasis on a subject in which the instructor is attempting to enlist cooperation. It is better to have a few reasonable standards and safety rules for which there are logical explanations. Reasonable standards will appeal to the fairness of most students. Artificial requirements tend to stilt and regiment, thereby building up resentment and defiance, and lack of application.

Accident Prevention and Reporting

STUDENT SAFETY IS IN YOUR HANDS

Figure 9

Even though the shop instructor may have a well-organized course of study and is diligent in safety instruction, it is necessary that there by some visible proof that the instructor has not been negligent in teaching safety. A suggested method of proof of non-negligence on the part of the instructor is the use of forms and check sheets indicating the student has been taught the safety phase of the shop work. (See Appendix, pp. 92-103)

As a means of making sure that students understand safety rules and regulations, written tests are recommended before shop or machine operation begins. Errors made in these tests must be corrected through further instruction and retesting until the student demonstrates acceptable safety performance. Figure 9 illustrates the magnitude of the responsibility for safety place in the hands of the instructor.

A state law (See Appendix, pp. 110-124) has been passed that requires the use of eye protection. Regulations that relate to this law will be found on page 110 in the Appendix. Also, a state law (See Appendix, pp. 125-130) has been passed governing the actions and rules for first aid. The instructor should constantly review these state laws to avoid violations and maintain occupational safety standards.

Injuries may occur with the first or any further exposure to unsafe practices or conditions. The method of control involves immediate correction of unsafe practices and conditions as soon as they are observed, and taking disciplinary action in those instances where repeated corrections do not bring results.

When an accident does occur, a report should be prepared by the instructor, using the form found on page 102 . A copy of the report should be provided to the local school principal so that a report similar to that found on page 103 may be prepared.

ARRANGEMENT OF TOOLS

Tools should be arranged on tool boards or racks to provide easy checking at the end or during class period. Some instructors use kits of tools for each student, while others prefer to mount all the hammers, punches, wrenches, and similar tools on a large too board in a central shop location. (See Figure 10)

There should be a definite number of tools on such boards, and outlines of the tools should be painted on the board. Checking tools becomes an easy routine under such conditions. A supervisor or an instructor can scan a tool board and spot missing items at a glance. Instructors may wish to experiment with tool boards in order to find a system that is manageable.

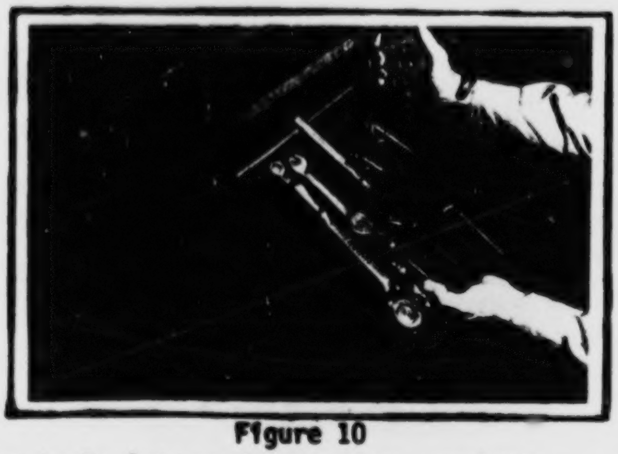


Figure 10

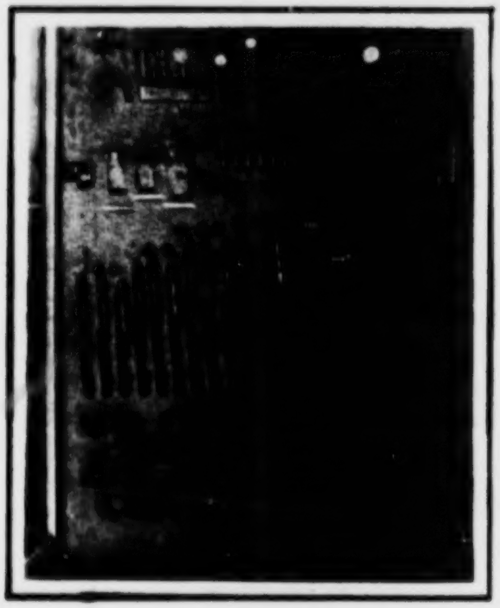


Figure 11

Fine tools (micrometers, gages, protractors, and the like) should be kept in a cabinet where they may be check frequently. If an instructor keeps an additional supply of drills, reamers, taps, dies, and similar items on hand, these should be kept under lock and key. (See figure 11)

Because the ability to spell and correctly use the names of tools is important to the worker, some teachers suggest that tool tickets rather than tool checks be used when students withdraw items from the tool crib. Numbered tool checks help the instructor keep track of the tools, but the check may not provide the practice needed in spelling tool names and the use of trade terms. A combination of the two systems may be desirable. Figure 12 is an illustration of a form that may be used as a tool check.

TOOL CHECK

Name____________________ Check No.____________________

Date____________________ Shop____________________

TOOLS	CHECKED OUT	CHECKED IN	CONDITION
1. 0"-1" Micrometer	✓	✓	Good
2. 2"-3" Micrometer	✓	✓	Good
3. 3/8" Twist Drill	✓	✓	Broken
4. 6" Rule	✓	✓	Rusty

Name____________________
Toolroom Manager

Figure 12

After-Hours Shop Work

The instructor will have repair and maintenance of machinery to take care of after class hours. Some learners will want to work in the shop after regular class hours. If proper supervision is possible, students may be encouraged to spend additional time in the shop. The instructor should be careful about letting students work on dangerous machinery after hours without proper supervision. No encouragement should be given to after-hours work that cannot be carefully supervised.

MATERIALS AND SUPPLIES

The shop instructor should anticipate material and supply needs and request what is needed to carry on instruction in the shop. Students should not be sent on errands to pick up supplies or materials away from school or for any other purpose.

Occasionally, items have to be ordered from a larger city, miles from the school shop. A delay of several days in getting material may disrupt the shop routine unless ample time is allowed for shipping. It is necessary for the shop teacher to anticipate the material or supply needs well in advance. The instructor should become familiar with the purchasing system of the local school and follow the plan to the letter. (See Figure 14)

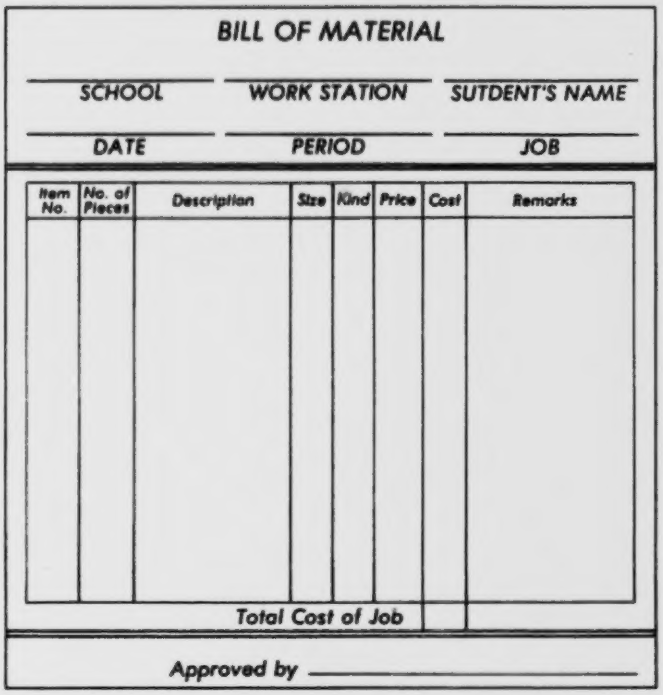
Figure 13

Charging for Materials

Instructors in many schools receive money for supplies used and articles completed in the shop. It is recommended that a written receipt be given for every transaction of this kind. Carbon copies of the receipt should be turned into the central office at frequent intervals. The instructor may be issued a receipt by the person receiving the funds. A suggested form for a receipt of money turned in is illustrated in Figure 15.

Some shop instructors require a student to make out a bill of materials when starting a job. (See Figure 14, page 15 and Job Plan Sheet as shown on pages 137 and 138) When the Job Plan Sheet and the bill of materials are properly filled out, the student is permitted to draw all the needed items from storage. (See Figure 13) This arrangement helps the instructor to become familiar with the student's plan for the job or task and helps the instructor to systematize trips to the stock room and helps to keep the inventory up-to-date.

In many schools funds for supplies used and articles completed are collected before the articles are removed from the school shop. It is recommended that all funds be handled through the school office, a receipt being given to the individual for every transaction and a copy of the receipt furnished to the instructor. This procedure is excellent protection or insurance for the instructor.



BILL OF MATERIAL

SCHOOL ____ WORK STATION ____ SUTDENT'S NAME ____

DATE ____ PERIOD ____ JOB ____

Item No.	No. of Pieces	Description	Size	Kind	Price	Cost	Remarks
		Total Cost of Job					

Approved by ____

Figure 14

When a person is to be charged for materials used, it is preferable to collect the money at the time the stock is withdrawn from storage. Under no conditions should the project be removed or left unfinished without the student paying for the materials used.

Receipt No. **1233** ____ Date ____

Received from ____

Address ____

____ Dollars

$ ____ Job No. ____

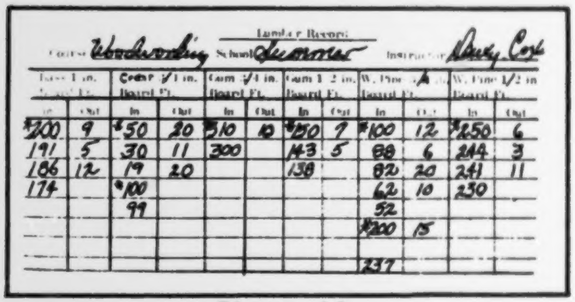
Shop ____ Instructor ____

Figure 15

Careful check should be kept on all tools, equipment, and supplies. It should be remembered that young people are developing ideals and habits, and should not be exposed to temptations through laxness in checking. All tools should be plainly marked so that they may be identified as school property.

Requisitioning Supplies

Requisitions for supplies are usually made out in triplicate or quadruplicate. Preparing requisitions properly is no small task. New teachers should seek help from someone in the school system familiar with completing requisition forms. Carefully check each item ordered to make certain that no detail has been missed or incorrectly stated.



Lumber Record

Course Woodworking School Sumner Instructor Andy Cox

Bass 1 in. Board Ft.		Cedar 3/4 in. Board Ft.		Gum 3/4 in. Board Ft.		Gum 1 1/2 in. Board Ft.		W. Pine 3/4 in. Board Ft.		W. Pine 1/2 in Board Ft.	
In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
$200	9	$50	20	$310	10	$150	7	$100	12	$250	6
191	5	30	11	300		143	5	88	6	244	3
186	12	19	20			138		82	20	241	11
174		$100						62	10	230	
		99						52			
								$200	15		
								237			

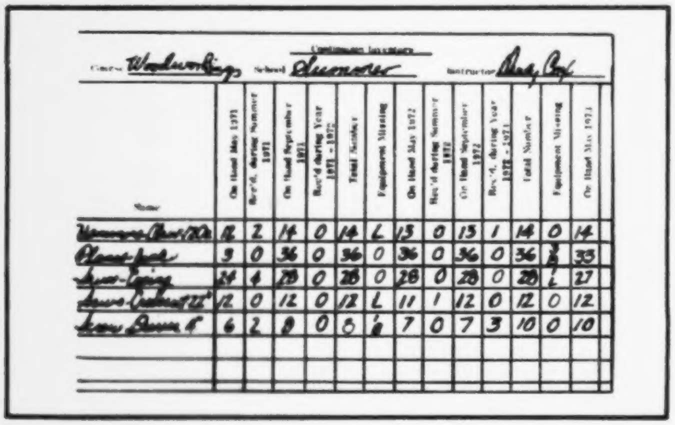
Figure 16

It is important that each item be fully described. In such a simple process as ordering bolts, one must not merely list 12-1/4-inch bolts. The length shape of head, kind of thread, and any other specification should be given along with the number wanted and the diameter. Frequently, it is wise to name a substitute item if one may be used. This practice may avoid costly delay if the order is to travel to some distant point to be filled. Every item should be "looked up" in a catalog, and all specifications should be given on the requisition.

If an annual requisition is expected of the instructor it will be well to keep track of all items ordered during the school year. This list will give a key to the basic requirements for the coming year. After making a inventory of supplies on hand and comparing it with the material ordered during the year, one would have a starting point for a list of materials needed for the coming year.

Some instructors like to copy the prices of items from invoices as well as the items received. This practice is helpful in that it gives the instructor accurate figures upon which to base charges for certain items, and it gives actual data for budget purposes, should a budget be required. It is well to be informed on instructional materials cost.

When outside jobs are taken in by the school shop, accurate data should be available as to the amount spent for supplies and other materials used. (See Figures 16, 17, and 18 and Appendix, p. 79)



Continuous Inventory

Course Woodworking School Sumner Instructor Andy Cox

Name	On Hand May 1971	Rec'd. during Summer 1971	On Hand September 1971	Rec'd during Year 1971 - 1972	Total Number	Equipment Missing	On Hand May 1972	Rec'd during Summer 1972	On Hand September 1972	Rec'd. during Year 1972 - 1973	Total Number	Equipment Missing	On Hand May 1973
[illegible]	12	2	14	0	14	1	13	0	13	1	14	0	14
Planes, jack	3	0	36	0	36	0	36	0	36	0	36	3	33
Saws, Coping	24	4	28	0	28	0	28	0	28	0	28	1	27
[illegible]	12	0	12	0	12	1	11	1	12	0	12	0	12
[illegible]	6	2	8	0	8	1	7	0	7	3	10	0	10

Figure 17

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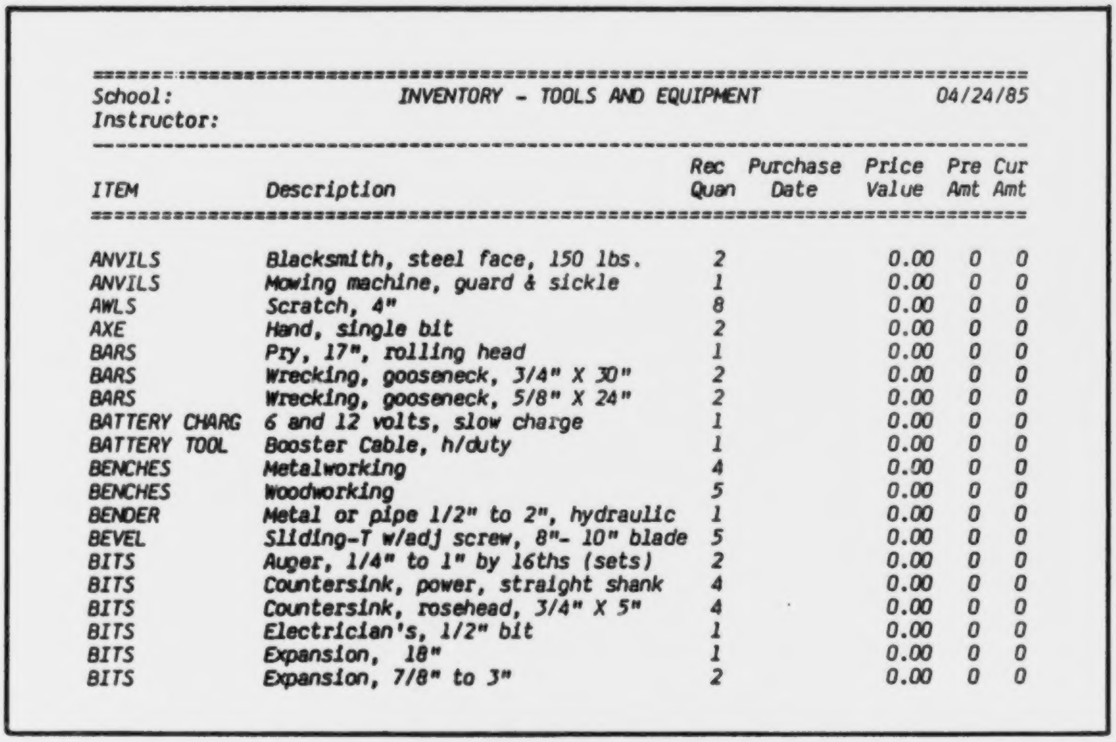

```
==============================================================================
School:                     INVENTORY - TOOLS AND EQUIPMENT               04/24/85
Instructor:
------------------------------------------------------------------------------
                                                Rec  Purchase   Price  Pre  Cur
ITEM           Description                      Quan   Date     Value  Amt  Amt
==============================================================================

ANVILS         Blacksmith, steel face, 150 lbs.    2             0.00    0    0
ANVILS         Mowing machine, guard & sickle      1             0.00    0    0
AWLS           Scratch, 4"                         8             0.00    0    0
AXE            Hand, single bit                    2             0.00    0    0
BARS           Pry, 17", rolling head              1             0.00    0    0
BARS           Wrecking, gooseneck, 3/4" X 30"     2             0.00    0    0
BARS           Wrecking, gooseneck, 5/8" X 24"     2             0.00    0    0
BATTERY CHARG  6 and 12 volts, slow charge         1             0.00    0    0
BATTERY TOOL   Booster Cable, h/duty               1             0.00    0    0
BENCHES        Metalworking                        4             0.00    0    0
BENCHES        Woodworking                         5             0.00    0    0
BENDER         Metal or pipe 1/2" to 2", hydraulic 1             0.00    0    0
BEVEL          Sliding-T w/adj screw, 8"- 10" blade 5            0.00    0    0
BITS           Auger, 1/4" to 1" by 16ths (sets)   2             0.00    0    0
BITS           Countersink, power, straight shank  4             0.00    0    0
BITS           Countersink, rosehead, 3/4" X 5"    4             0.00    0    0
BITS           Electrician's, 1/2" bit             1             0.00    0    0
BITS           Expansion,  18"                     1             0.00    0    0
BITS           Expansion, 7/8" to 3"               2             0.00    0    0
```

Figure 18

CHAPTER 3

PREPARING TO TEACH

Starting a new teaching job is quite different from securing and starting a new job in a trade. There are many items to consider that were not present when working as a tradesperson. The pre-employment shop instructor is not responsibile for the activities of a group of students. The instructor is responsible for the operation of a complete shop, rather than the operation of one machine or department.

It is recognized that a high degree of skill in the trade is an important factor, but a knowledge of the laws of learning, analysis and human behavior is vitally necessary for successful shop instruction. For efficient teaching one should also be able to make application of the laws, principles and methods used in the teaching-learning process.

Area Occupational Education Specialists can give firsthand information about the units and courses that will assist the beginning teacher plan a program of studies for efficient teaching and certification. Courses offered by Vocational Industrial Teacher Educators are designed to furnish the new instructor with the necessary "tools of the teacher" to use along with the craft or occupational tools. Teacher education is as important for the pre-employment shop instructor as it is for the academic teachers. It is not enough to know one's occupation; a person must be prepared to teach students definite subject matter and skills. The pre-employment shop instructor must know what to teach and how to teach.

A good start in teaching is essential. There are many details involved in getting ready. It is the purpose of this chapter to describe some of the necessary steps in preparing to teach.

Preliminary Meetings and Conferences

The new instructor should schedule time for any preliminary meetings or conferences set up by the superintendent, principal or supervisor. Some schools have regular meetings and conferences prior to the opening of school. Determine what is expected and make arrangements to be on hand for all meetings. Be prepared to make a worthy contribution.

The pre-employment shop instructor's responsibility does not end with the teaching of the students--they must be placed on the job--the instructor must, therefore, establish contacts with businesses or industries in which students may find employment. It is necessary that the instructor keep employers well informed on what the vocational industrial education program is accomplishing, and at the same time, keep well informed on employment opportunities for students, as well as the needs of employers.

Understanding the School System

The new instructor should become acquainted with the other teachers on the faculty, especially those who teach the same or similar subjects. Discussions with fellow teachers will help in understanding the customs, habits, and instructional intent of the local school. If a handbook of rules and regulations is available, it should be studied carefully. As a member of the school faculty, the new instructor should plan to participate in extra-curricular and community activities.

Examining the Equipment

Prior to the opening of school the new instructor should inspect the shop and classroom. If this inspection indicates that changes should be made, these changes should be brought to the attention of the administration.

Examine each piece of machinery, equipment, or tools, and note, in writing, the condition of each. If this inspection indicates that a change, repair or replacement, should be made, repairs and replacements should be made as rapidly as time and funds will permit. Equipment that is not in working condition should be blue tagged with "Out of Order". The blue tag should not be removed until the machine is properly repaired. Written statements may serve as a permanent record when the instructor moves on to another position or should a question arise concerning the condition of the equipment. This careful inspection will acquaint the new instructor with the details of every piece of equipment in the shop.

Inventory cards or computer inventory printouts should be compared with items in the shop to prevent being charged with equipment, tools, and supplies not actually available. If no inventory record is available, a system should be set up as soon as possible. The Trade and Industrial Education Area Specialists can assist in standardizing the inventory and other records.

Shop Organization

The manner in which supplies are stored, tools are kept, and clothing is handled indicates how well the instructor can organize the shop. Cabinets, shelves, cribs, and other storage facilities should be planned to meet the needs of the shop and be kept neat and clean.

Whenever possible, some type of baffle or wall should separate storage space from the main shop for orderly appearance. This screening of the stock or supply area does not give an instructor license to keep old unused, unwanted, and unsightly material in this space. The instructor must be alert to cleanliness and orderliness. The instructor and the shop should serve the students and other shops in the community, as a model in organization, desirability of shop environment, and mastery of detail. The aforementioned items are built-in experiences each student will pass through for the purpose of developing desirable attitudes, abilities, and appreciations. The wise instructor will build-in many more experiences for the development of desirable attitudes.

Organizing the Shop

The preliminary examination of the shop may reveal that certain rearrangements would imporve organization. Regrouping or rearranging machinery may run into a considerable expenditure, and this practice should be kept to a minimum. Benches, stock rooms, tool cribs, tool panels, and similar items

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may be shifted to effect a better shop organization. However, the proper school official should be contacted before any changes in the shop are made.

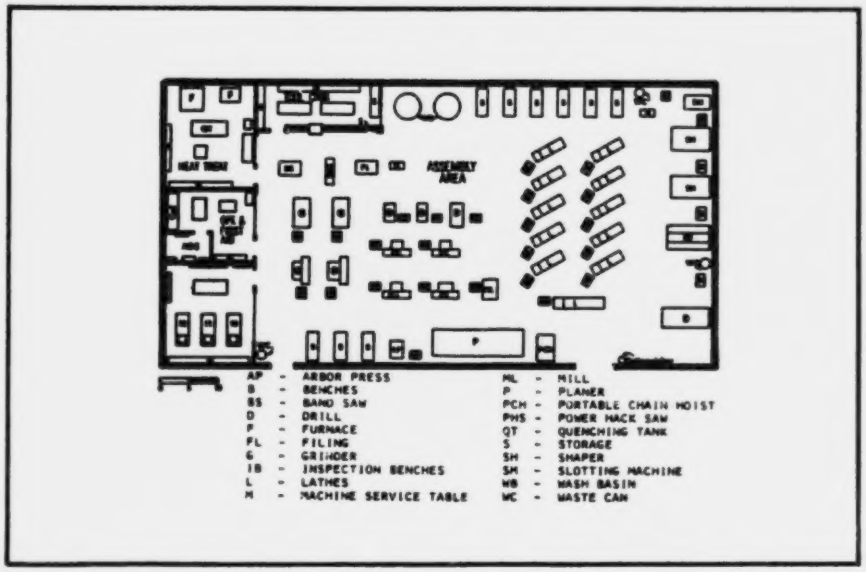


Figure 19

When a related instruction classroom adjoins the shop, it is well to have eye-level windows spaced to give the instructor a view of either the shop or the classroom at all times. Many books and magazine articles are available on shop plans and layouts.

One such publication is:

Storm, George, Managing the Occupational Education Laboratory, Prakken Publications, Inc., P.O. Box 623, Ann Arbor, Michigan 48107.

DETERMINING INSTRUCTIONAL OBJECTIVES

An instructor in any occupation must first determine the objectives or purpose of the instruction. The realization of this fact is considered by many good teachers as the most important consideration in preparing to teach pre-employment shop classes. An objective is a definite goal to be attained. The instructor should make the objective or purpose of the program known to the students. Objectives are always written in terms of the learner. The objectives state what the learner will be able to do upon completion of the course. The objectives also state the standard of performance that the student will attain.

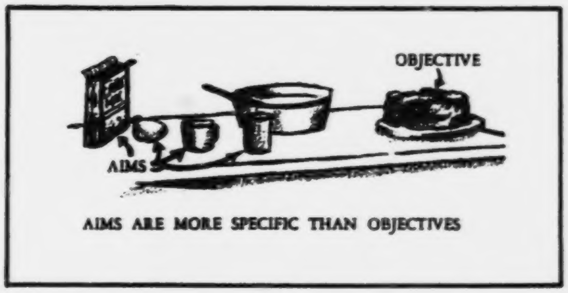

OBJECTIVE
AIMS
AIMS ARE MORE SPECIFIC THAN OBJECTIVES

Figure 20

Aims are more specific than objectives, although many authors use the terms interchangeably. Aims indicate what the learner will be able to do upon completion of a lesson. One might state the objectives of a machine shop course as "THE STU-

DENT WILL BE ABLE TO SKILLFULLY AND INTELLIGENTLY" use the standard machine tools, handtools, and accessories of the machine shop. A specific aim might be "the student will be able to use a 5/8-inch NC Hand Tap in Tapping a Blind Hole." (see Figure 20)

THE COURSE OF STUDY

In industry, the craftsperson could answer the question of "What do I do next?" by checking blueprints and production schedules. In teaching, the answer to "What should the student do next?" can be answered by reference to the course of study. The course of study should be based upon an analysis of the trade and an arrangement of jobs in an order most meaningful to the student. This allows the students to progress logically from the simple to the complex in an orderly fashion.

WHAT SHOULD THE LEARNER DO NEXT ?

Figure 21

Even though the course of study organizes the material of the trade analysis into the proper teaching order, the instructor still has the problem of organizing day-today activity for continued progress of the student group. Some schools require the teacher to prepare a plan book that gives complete details of the lessons to be taught during the current week. Others have a planned course of study which must be adhered to rather closely.

Competency listings set forth in the course of study and carried out in the job assignments should reflect the skills to be attained by the individual. The competency profile folder and progress chart indicate the material already covered, the students' performance, and, when kept up to date, it indicates material yet to be covered.

Because it is well to have copies of good courses of study in one's own field, an instructor should determine what is available in the local office, state office, area office, other states, Vocational Instructional Services, or other curriculum centers. If a course of study is not available for an instructor's specific shop, it would be wise to make a course of study incorporating the best features of the available material.

LESSON PLANS

Good teaching is planned teaching. Success of any teacher depends upon the skill and thoroughness with which each teaching detail involved in helping the learner to learn is considered in advance.

Successful teachers have an organized plan or procedure for efficiently teaching a complete lesson. Each plan consists of what is termed a complete and logical account of the proposed teaching progress of the lesson, whether it is a performance or related information lesson.

Advantages of well organized lesson preparation is that it:

(1) Encourages the instructor to think through the lesson in advance;

(2) Provides protection against forgetting important items;

(3) Provides good learning environment;

(4) Provides continuity in the learning process;

(5) Provides logical learning process;

(6) Provides remedies for situation which may arise;

(7) Provides ready reference in case of interruption;

(8) Creates a feeling of confidence.

The lesson plan need not be written out in great detail. A plan can be complete and practical, yet consist of only sufficient notes and reminders to cover a demonstration or the related information. The teaching plan is prepared by the teacher prior to teaching the lesson. It is actually a guide for conducting the instruction and is not intended to be inspected by the learner.

Lesson plans also provide the school administration with a schedule of the teacher's plan for teaching over a period of time. The teacher may be required to provide the principal with weekly lessons plans which identify the material to be covered, student learning activities, and assignments. These lesson plans may be weekly, monthly, or for a semester, depending on school policy. Usually the plan is brief and identifies the activity to be covered, when it is to be covered, and how it is to be covered.

For convenience, the steps involved in making lesson plans may be found on pages 64-65 of Standards and Formats for Vocational Industrial Instructional Material. The plan should be kept short and concise. As in writing a telegram, everything said in the plan should count. The form shown in the Appendix, pages 66-76 , and the suggestions listed on pages 23-25 should be used. In any event, the content should be taken from the course of study.

Lesson Plan

To be complete and effective, a lesson plan should contain the following factors:

1. Descriptive Title: The title should state the skill or information to be learned so that future references will make immediate location possible. For the information lesson the title or subject is expressed in the form of an order; something to do.

2. Aim: The plan should contain a brief statement of the immediate intent of the lesson. The aim amplifies the title by stating specifically what the learner will be able to do successfully and standards to be met.

ORGANIZE LESSON PLANS

Figure 22

3. Lesson Content: The information lesson takes the form of a detailed topic outline of subject matter, logically arranged in the order to be presented. The performance lesson has steps and key points arranged in an order of logical performance.

4. Facilities for Instruction: Facilities must be determined and prepared for both the information and performance lessons.

5. Learner Prerequisites: Learner experiences or preparedness is important and essential in planning the lesson.

6. Methods and Procedures: The methods to be used by the teacher are noted, and if the students are expected to perform these specific methods are also noted.

7. Teacher Activities: A column stating the proposed teacher activities constitutes the core of the teaching plan. Reference to any topic of content will be made at the point in the procedure where any topic or step is to be presented. This will insure orderly and complete presentation.

8. Student Activities: In connection with each item of teaching activity a corresponding learning activity is stated.

9. Instructional Aids: Charts, demonstrations, graphs, movies, cutaways, and sample jobs are used to bring the teaching to life. Recent tests show that 75 to 85 percent of our learning is visual while only 5 percent to 10 percent of learning results from listening. This fact makes it highly important that full use of visual material be made. The duplicator is an important means of reproducing material for distribution to students.

10. Correlation With Previous Learning: A statement showing how the present lesson ties in with previous material is included in the lesson plan. Review questions and drills will help to integrate instruction into a unified program.

11. Teaching Points: Key words and expressions used by the teacher are included for the purpose of assisting in presenting new material.

12. Check-up Questions: Oral questions or the use of a short objective type test will fit into the lesson for the purpose of clarifying understanding.

13. Review of New Words or Terms: Review and repetition tend to "fix" the new material that has been presented New words and new trade terms are reviewed often to fix material in the learner's mind through repetition.

14. Assignments and References: Assignments should not be busy work; any assignment made will relate directly to the task being done. It is best that the assignment be short and to the point. There should be no doubt in the learner's mind as to the nature of the work that one is expected to do.

15. Verifying the Learning: Information learning, which deals with ideas, is verified largely by means of questions which require the learner to recall, reason or express decisions for action. Such questions are carefully determined and written into the lesson plan. Skills are verified through performance tests which include objective checking standards.

16. Summary: Gives a brief account of each topic, reemphasizes the important points. The summary may be given at any place in the lesson that the teacher feels will be profitable to the learner.

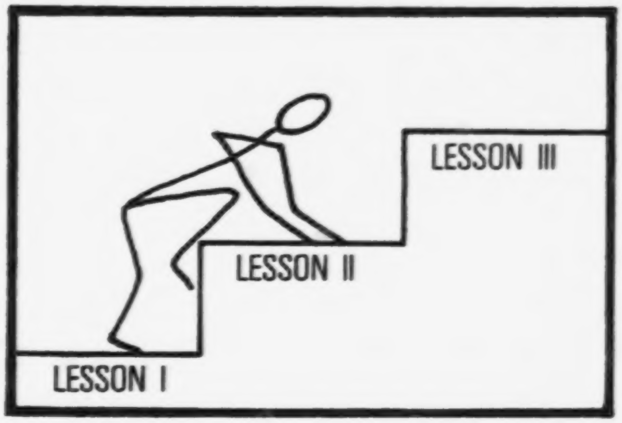
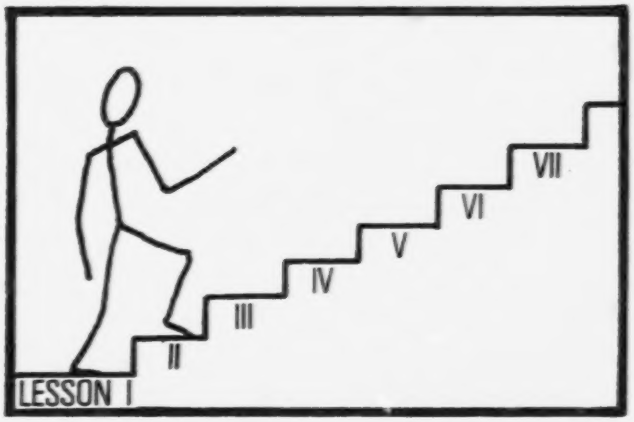
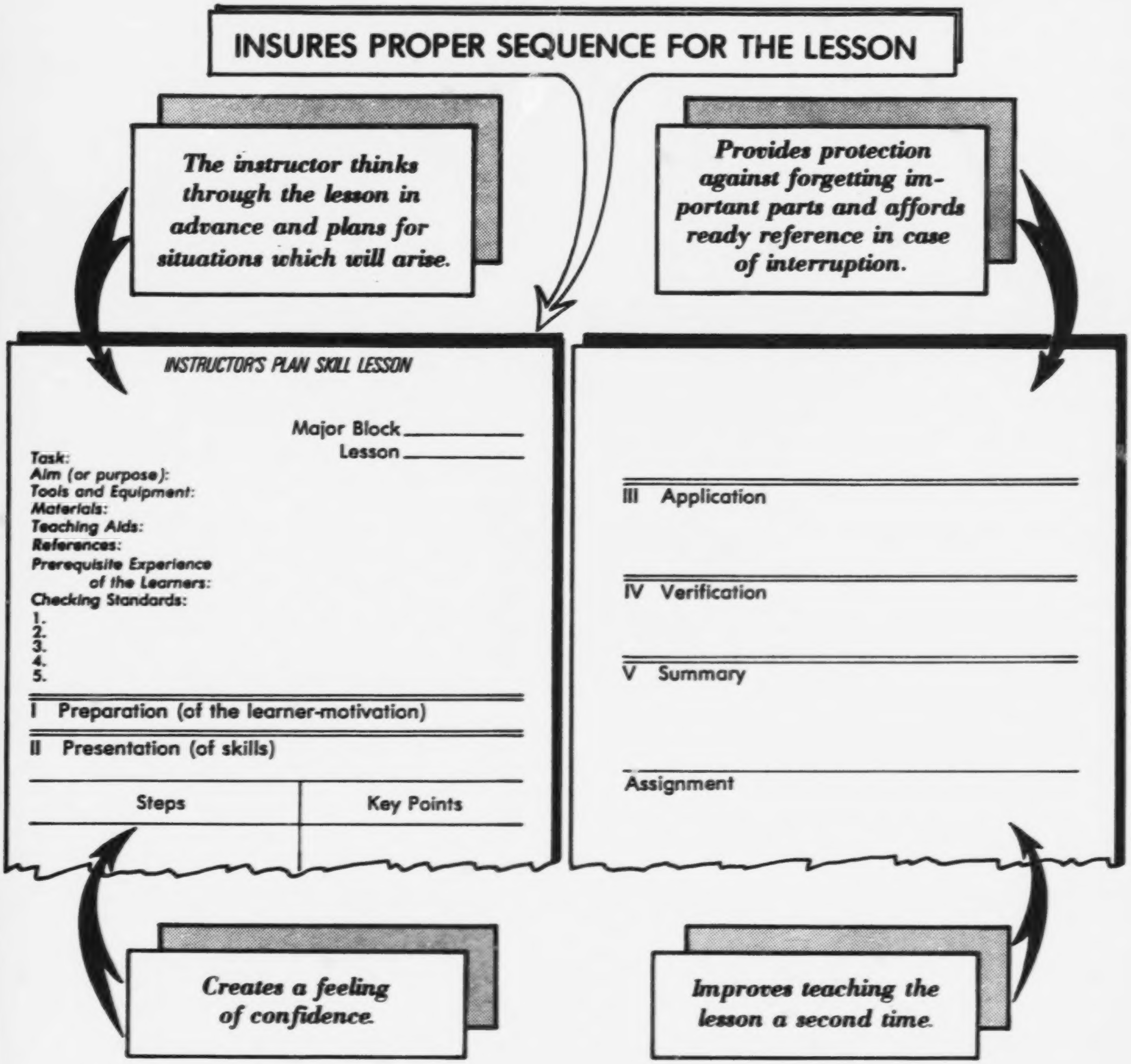


Figure 23



Lessons are to be prepared and presented in easy stages. Each presentation should meet the needs of the students. Each lesson should be comprehensive yet attainable for the student.



INSURES PROPER SEQUENCE FOR THE LESSON

The instructor thinks through the lesson in advance and plans for situations which will arise.

Provides protection against forgetting important parts and affords ready reference in case of interruption.

Creates a feeling of confidence.

Improves teaching the lesson a second time.

INSTRUCTOR'S PLAN SKILL LESSON

Major Block __________
Lesson __________

Task:
Aim (or purpose):
Tools and Equipment:
Materials:
Teaching Aids:
References:
Prerequisite Experience of the Learners:
Checking Standards:
1.
2.
3.
4.
5.

I Preparation (of the learner-motivation)

II Presentation (of skills)

Steps	Key Points

III Application

IV Verification

V Summary

Assignment

Figure 24

Arranging Jobs in a Learning Order

For more detailed information on this subject refer to:

Mager, Robert F. and Kenneth M. Beach, Jr., Developing Vocational Instruction, Fearon Publisher, 6 Davis Drive, Belmont, California 94002, Ch. 10.

An instructor should not start a new learner on a job that requires a great many steps or processes. Complex jobs in the first stages of a course tend to confuse the learner, causing the loss of interest in assigned work almost as soon as it begins.

Learners are given an opportunity to progress from the simple to the complex tasks or jobs through a series of well-organized lessons. Repetition is provided to help "fix" skills with reasonable assurance of retention.

Laboratory instruction may be organized so that teaching may be on any one or more of the following plans:

1. The Departmental Plan: Students are organized into small groups or teams for a specified period of time. A student supervisor assists the teacher in directing departmental activities. The department may or may not be a major block of the trade and the students are rotated through the work station of the major block or portion thereof, as the number of work station, students, and time will allow. For example, the cosmetology teacher may assign a group the task of cutting hair, while other groups would be assigned styling hair or applying a tint.

2. The Daily Assignment Plan: The instructor should furnish the student with job and task sheets for the student to progress through the various work stations of the shop. These jobs and tasks cause the student to learn and to produce finished products and services of a useful nature. These jobs and tasks should be arranged from the simple to the complex in consecutive order for ease of learning. The machine shop would be an example of this type of plan, whereby the student is given a job that incorporates a number of tasks that become more complex as the student progresses, until the job is completed.

3. The Project Plan: The instructor and the student collabrate in the selection of one or more projects for the student to complete by using machines, tools, drawings, fixtures, and other devices to gain the ability to perform and perfect techniques. These projects should be useful jobs. In this type of plan, a student in a course such as drafting, would select an item to be drawn in detail, utilizing those skills previously developed, that would be displayed and judged at contest as a student selected job.

4. The Production Plan: This plan utilizes the factory method, and the school shop is organized as a production shop. Students are rotated through a series of tasks, and each student makes several pieces of a kind to predetermined standards. Student supervisors "break-in" other students on the job and carry much of the load of quality control. This same procedure can be utilized in the service shop. Different students may have an opportunity to practice in all work stations of the shop. The students remain at a work station until proficient in all tasks of that station. This type

of plan can be utilized in such programs as carpentry, where one group would be cutting rafters, another group installing rafters, and a third group installing windows.

Although all of the forementioned plans may not be practical for every program, the instructor should attempt to utilize as many as possible during the year.

SHOP MANAGEMENT

Suggestions for arrangement of the physical facilities of the shop were discussed in Chapter II of this handbook, and that activity is generally know as Shop Organization. Management is the orderly direction, control, and supervision of students according to the plan of organization.

A teacher should maintain a position where it is possible to see and know all that is taking place in the shop. Even this knowledge is not enough. Students who must leave the shop (and not more than one should be out at any one time on the same mission) are the responsibility of the instructor. Students will sometimes engage in unwanted activities unless additional challenging tasks are assigned to them when they finish their regularly scheduled work before the closing of class. Scheduling and rotating students must be done with fairness and equity. Control measures must be planned, put into practice, and followed up to insure a shop that indicates the instructor is actually managing the program.

Managing Student Activities During Shop Session

For successful management of student activities during shop sessions, it is suggested that the instructor:

1. Make definite instructional assignments of jobs and tasks to each student.

2. Discuss the course content with the students. Students must know and understand what they are expected to do.

3. Keep a progress record for each student. Each student is to be kept informed on personal progress.

4. Observe students at all times.

5. Circulate among students in order to keep close check on their performance.

6. Treat students as adults. The instructor is courteous, patient, and understanding.

7. Operate the class as similar to a good industrial establishment as possible.

8. Have definite rules and regulations.

9. Each student, upon entering the class, must be instructed in the rules and regulations governing the shop or class. Each student must be furnished with a copy of the rules and regulations.

10. The rules and regulations are to be as similar to those of industry as possible. Rules and regulations are to be few in number as possible.

11. Plan distribution of time among students.

12. Establish a reference library and keep other reference materials available.

13. Act natural, be considerate, helpful, and understanding to students and fellow faculty members.

14. Have an assigned task for each student which will help to close the class period.

15. Tools, equipment, supplies and cleaning utensils must be returned to their assigned places at the close of each class period.

16. Group students whenever lessons of general interest are to be presented.

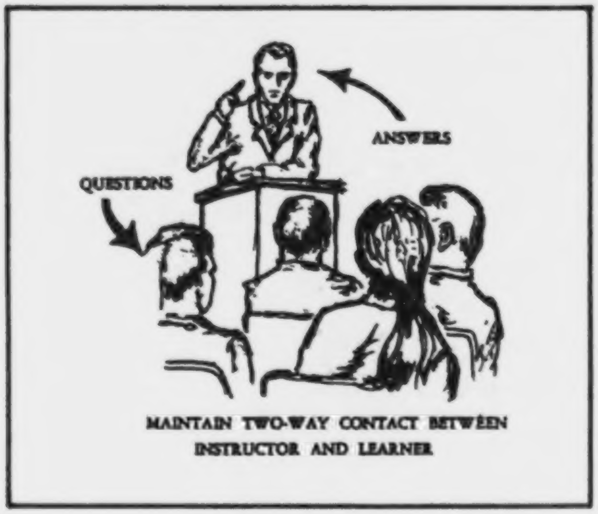

ANSWERS
QUESTIONS
MAINTAIN TWO-WAY CONTACT BETWEEN INSTRUCTOR AND LEARNER

Figure 25

CHAPTER 4

TEACHING PLANS AND DEVICES

Just as a skilled person goes about work in a definite, logical order because this is the most effective way to get something accomplished, so the instructor has a definite way to perform the job of teaching a learner. A good worker and a good teacher always think ahead and plan the order in which the various details of any job will be performed.

Stages in Teaching

Teaching is a planned effort to help the learner to learn. There are five stages involved in teaching a lesson or a task. The stages are: Stage I-Preparation; Stage II-Presentation; Stage III-Application; Stage IV-Verification; or Evaluation; and Stage V-Summary. These names indicate what takes place in each stage of the lesson, making it easier to remember each stage of the complete teaching process.

Stage I-Preparation. In this stage the instructor prepares the mind of the learner to receive the new information or skill.

The instructor puts the learner at ease and provides instructional reassurances. The learner may be worried about your expectations of performance or meeting standards. Prove by what you say and do that nothing is expected that can't be learned with reasonable effort, and that you are interested in only one thing--to help make the learning easier and more effective.

The instructor explains the lesson, the need for it, and makes sure that the trainee understands its importance. When the task or lesson is understood in relation to the whole picture, the learner becomes more interested in learning to do the task the correct way.

Figure 26

The greater the student's interest the easier the job of teaching.

The instructor must create interest for the lesson. An instructor may be certain of the student's interest when the students realize that it will be to their personal advantage to learn to do, and do well, the tasks or information that they will be taught.

Students will improve their ability to do a task, and their ability to make a living. The learner will be able to work more easily and more effectively. That means progress and success. The learner can see the need for the lesson and how to profit from it.

Figure 27

Figure 28

Stage II-Presentation. In the second stage, the instructor presents the new information or skill. (See Figure 28)

As a performance lesson is presented the students must be able to see all movements without having to reverse the manipulations in their minds. Teachers must place students in a position that each will be able to see every move and hear every word. This means a small group or an individual is placed to the instructor's right or left and facing the same direction.

Follow the task breakdown for teaching a performance lesson. When teaching an instructor must have the task breakdown in the lesson and the breakdown must be followed. This will keep the instructor on the track and insure economical and efficient instruction.

Follow the organized topics and teaching points when teaching an information lesson.

Explain, demonstrate, and instruct one step at a time. The instructor is not to "throw the book" at the student. Teach one step at a time and learning will be accomplished quickly and satisfactorily.

Stress key points or teaching points. Students must be told what the task or information is, how it is to be done or applied, and why it is to be done, and why it is to be done that way. In doing this, stick to key points or teaching points. Time is not to be wasted on unimportant details A student's capacity to absorb and retain long presentations is limited.

If the instructor's lesson is cluttered with a lot of unimportant material, it will be difficult for the student to receive and retain the important facts.

Avoid presenting too much at one time. This is attempting to teach too fast, and very little learning will take place. Present the student with only that amount of material that can be absorbed at one time.

Use simple language. The purpose of language is to be understood or to communicate with others. Big words or unusual words and phrases may cause some people to think the instructor is smart, but the lesson will not be effective. Plain talk is best when presenting material to learners. When technical words or terms are needed spell them correctly, pronounce them correctly, write them on the chalkboard and explain them.

The instructor is not to all the talking. Students learn more from a discussion than they do from pure lecture; and a discussion is a two-way affair. Students do more thinking during a discussion and learn better when they think. Make the students think by posing problems to be solved and questions to be answered. With this technique, the instructor will be unable to do all the talking.

The instructor must set a high standard of performance. When students observe an instructor perform, they regard that performance not only as a demonstration of how to do it, but also as an example of how well to do it. The instructor cannot expect the students to do a first-class job after giving a second-class demonstration. The quality of work demonstrated for the student sets the standard and will govern the quality of the student's work after the instructor is gone. This applies to everything in the instructor does, which will include the attitude toward work, the hour of arrival on the job, the amount of time taken for lunch, and the time of departure in the afternoon.

The instructor explains the reasons for methods or procedures used. The more students understand about why a task is done or why it is done a certain way, the quicker they will learn to do it. Ideas that have meaning are always learned more easily and remembered longer. This applies to the "telling" as well as the "showing" part of teaching.

If the instructor is teaching a student fundamentals of electricity, or to make out specific forms, make that the principal aim until the learner has learned to apply the information or do the skill. The instructor is not to attempt to teach everything in the book at one time. It cannot be done.

The instructor must present everything that is wanted back, but no more. The instructor is not to tell the trainee everything about a task or all the information, but the instructor will cover all the important points that the student must have to do the task correctly or to utilize the information. Any more will result in confusion and additional instruction which, in turn, means wasted time and effort.

Stage III-Aplication. In the third stage the instructor has the learner apply the new information or skill which has been presented. (See Figure 29)

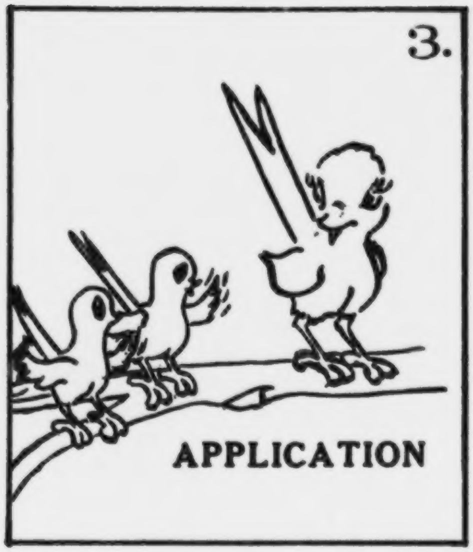


Figure 29

The student must have an opportunity to actually do the task or apply the information. Good retention is not acquired merely from listening or watching, but its potential is greatly enhanced when the student has the opportunity to actually apply the learning. It is very important that the trainee actually perform the task or apply the information. By doing the task right or using the information correctly the learner builds self-confidence, which is necessary for successful performance.

One way to be sure that the student will succeed is to start at the simple and gradually work toward the complex level.

The student must be able to tell the instructor the why and how, and be able to stress the main points of either the skill or information lesson. The instructor makes sure that the student clearly understands how the task is to be done and the reason for doing it a particular way. Test the students' understanding by having them stress the main points when they perform the task or when they are applying a theory or using information from the lesson.

The instructor corrects errors and omissions before the student makes them through the use of oral questions and discussion. If the need arises the instructor takes the opportunity to reteach the task or information.

> Avoid criticism. No one likes to be criticized, but most students want to learn. Any criticism must be constructive. Therefore, avoid criticism in the sense of "bawling out" a student for having done something wrong. Instead, show how it could have been done better. When the instructor takes this approach, correction becomes instruction. Correction in this manner becomes a friendly, helpful act and not belittling and irritating to the student.
>
> Compliment. Always find something for which a student can be complimented before correcting a mistake. Make sure the compliment is sincere.
>
> Let students correct themselves. This is the best of all correcting techniques. When students are induced to correct themselves unpleasantness is almost entirely eliminated. Therefore, make it a rule, first to compliment, and then to ask the student what could have been done to make the performance better. If the student is unable to think of anything, the instructor will have to make a suggestion.

Correcting should not be overdone. Correction is like seasoning, a little goes a long way and too much spoils the dish. Teachers must exercise restraint in the correcting of student performance.

Correcting should not be done in front of others. This is the worst type of criticism. It is highly embarrassing and demoralizing to the student.

Caution should be exercised in blaming the student. If the student fails to perform right, the fault may lie with the instructor's method of teaching. Keep in mind the saying "If the learner has not learned, the instructor has not taught."

Encourage the learner. Compliments are an essential part of teaching. They encourage learning. A sincere compliment gives the learner the experience of success. Success builds confidence, and confidence is necessary if students are to persist in their efforts to learn.

Get back everything given out in Stage II. Make sure the student repeats instructions completely and accurately. The task must be performed or the information applied exactly as presented to determine that it is known and understood.

Continue instruction until the student knows. The instructor must find out whether the student really know how to do the task. The student must do the task over and over until the instructor is certain the student can do it correctly and that the student understands why the task is being done a certain way.

Stage IV-Verification and/or Evaluation. The fourth stage is used to determine the instrutor's effectiveness and how much learning has taken place. It is to find out if the learner has actually acquired the new information or the new skill to the extent that the information can be used successfully or the task successfully performed. (See Figure 30)

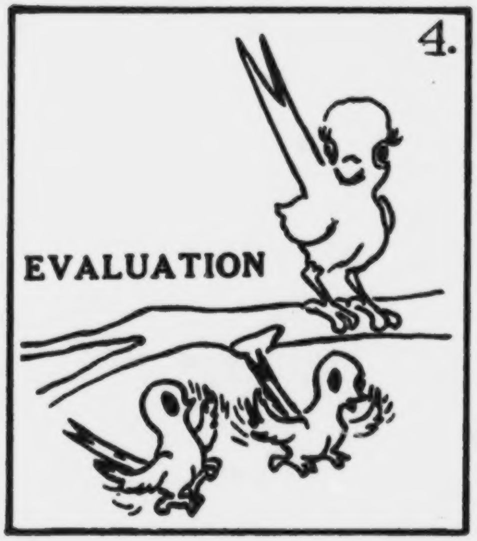


Figure 30

Put the students on their own to do the task or to apply the information. When the instructor has become satisfied that the students can do the task or understand how to use the information, the students are put on their own. In this way the students continue to build their confidence in their ability to do the task.

Encourage students to ask questions and be sympathetic to all questions. Make it clear to students that asking for help is not a sign of weakness. No matter how simple the question may seem to the instructor, treat it with respect and seriousness.

Check students' performance frequently. Check students' performance as often as necessary; gradually taper off as students' abilities increase.

Let students know how they are progressing. If students are doing the task or applying the information the way the instructor wants it done, tell them so, for this will add to students self-confidence. If students are not performing as the instructor thinks they should, reteach. The proper time to correct an error is at the time it is made. The instructor should not assume that after students have had some experience with a task, the errors will eliminate themselves. It is the instructor's responsibility to let students know on what phases improvement is needed.

Remember. The verification or evaluation function may run throughout the entire five stages of the lesson. At no time should the instructor relax when the student's learning is at stake.

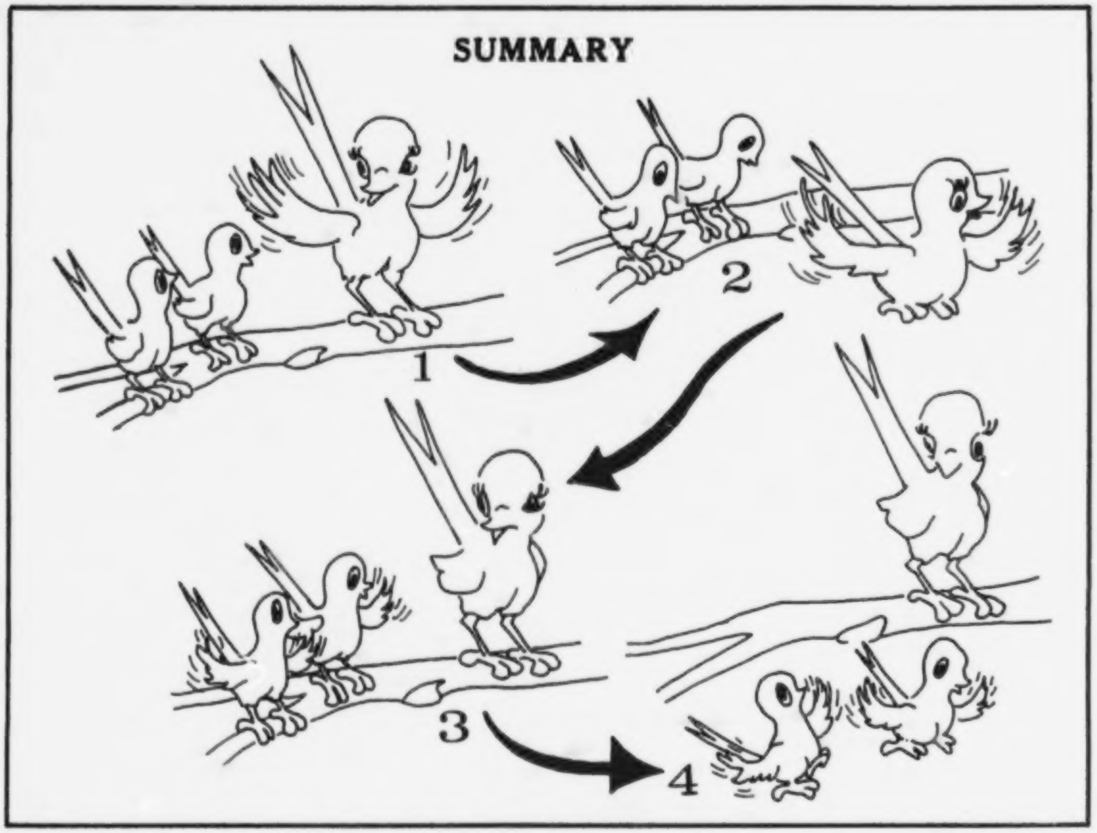


Figure 31

Stage V-Summary or Review. The fifth stage reemphasizes the high points of the lesson to help to clarify understanding and to complete the communications procedure in teaching. (See Figure 31)

The instructor will select the appropriate time for using a summary or review. A Summary or review may be used as many times in any one lesson as the instructor feels is necessary to clarify a point or points. The instructor is to select the appropriate time and place in the lesson for the summary or review, whether it is during or after Stage II, Stage III, Stage IV, or in all three Stages. Many times the summary is used before the student is to apply the skill or use the information as presented by the instructor in Stage II. The instructor may summarize or have the student summarize the steps or procedure or "what to do" and emphasize the key points (how, why, and the safety precautions) and give the checking standards for performance lessons. For information lessons the teacher may have the students outline or explain the main points for each topic.

Teaching Tools

There are tools or methods used by good teachers to secure effective results from their teaching efforts. If teaching is thought of as a trade, these methods become the tools which the teacher uses to produce the best results. Every skilled person knows that all tasks in the trade cannot be done with the same tool. Teaching may be performed by using the various teaching tools. To select the best and most effective tools in any given situation is the mark of a good teacher. Teaching tools are most effective when used in combination with sound principles of teaching and learning.

Teaching tools can generally be divided into four groups:

1. Telling
2. Asking
3. Showing
4. Doing

Telling. There is an old saying that "telling isn't teaching." There is much truth in this saying, as good instruction must provide for two-way communication between instructor and student. It is acknowledged that there is a need for "telling" or "lecturing", but the teacher should exercise caution in its use, by utilizing other methods, such as discussion and group participation, which will be discussed later.

Factors that may contribute to the success of a lecture are:

1. A thorough knowledge of the subject, and material to be presented, properly prepared.
2. Material organized to give audience a clear understanding of the ideas being presented.
3. Beginning with the simplest phase of the topic and connecting to something which the members of the group already know.
4. Pronouncing for learner to hear, spelling out on chalkboard for learner to see, and giving clear definition of new words or technical terms.

The quality of oral instruction depends upon the instructor's skill in the timely use of effective techniques. Some techniques that can be used are:

1. Clear, simple language and logical explanation of ideas in a normal conversational approach.

2. A relaxed, natural position and movement of the body, so that all group members can see the speaker and the speaker can judge the individual reactions to the presentation.

3. Gestures that may be used to point out an item or reinforce an idea. The timing of these gestures is as important as the gesture. However, too frequent use makes it impossible to determine important key points.

4. A relaxed voice with material being presented at a fairly rapid presentation rate, pausing frequently for the group to catch up or take notes, and slowing the rate when presenting technical or difficult material.

5. Clarity in the pronunciation of words and correct English usage.

6. Illustrations to get across a point or the use of stories and humor.

As previously mentioned, the instructor should utilize methods of presenting information other than lecturing, such as the discussion or group participation.

Discussion differs from the lecture in that with guidance of the instructor the students provide most of the information. In the lecture, the instructor directly relates information to the students, whereas in group discussion the instructor draws upon the experience and knowledge of the students.

Advantages of the discussion method are that:

1. It provides for an informal situation in which learning may be facilitated;

2. It stimulates the student to think and participate;

3. It provides for more personal contact between instructor and student, which is essential to effective learning; and

4. It provides a good method for the instructor to determine how the student is progressing.

Other methods of group participation that are beneficial to learning, and where the objective is to develop human relations ability, is to include such methods as role playing, case studies, and brainstorming.

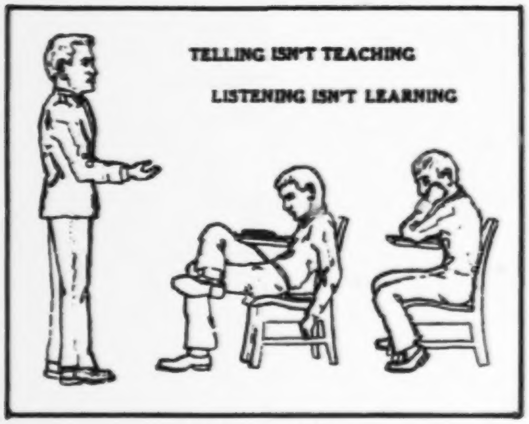


Figure 32

Asking. The asking methods are questions by the instructor which may be given either orally or in writing. Questions are an effective tool because they require mental effort and response on the part of the learner. It must be kept constantly in mind that the real purpose of instruction is to help a learner to learn.

Questions may be asked for several reasons, the most usual being to secure information from the learner. It is helpful to find out if the learner can give back to the instructor certain facts which have been previously explained. Such questions are sometimes called drill questions because by going over them and repeating correct answers, the learner will receive drill in these facts and will likely retain them longer. The teacher may also use questions to check on the manner in which the lesson is being received and understood by the students.

Another type of question is the suggestive question which will encourage the learner to assemble known information with the idea of developing some new information.

Cautions about questioning. There are certain definite cautions about questioning that are especially valuable to an instructor.

1. Questions must be stated clearly and concisely.
2. Ask for only one main item at a time. Avoid double and compound questions.
3. If questions are asked orally be sure to give a sufficient interval of time for the individual to think and formulate a reply before expressing an answer. Avoid the appearance of hurrying or rushing the learner's reply.
4. Ask questions in a helpful manner with encouragement and commendation given to those making correct answers. Many students are hesitant to reply if they feel they may be incorrect or may be exposed to some humiliation.

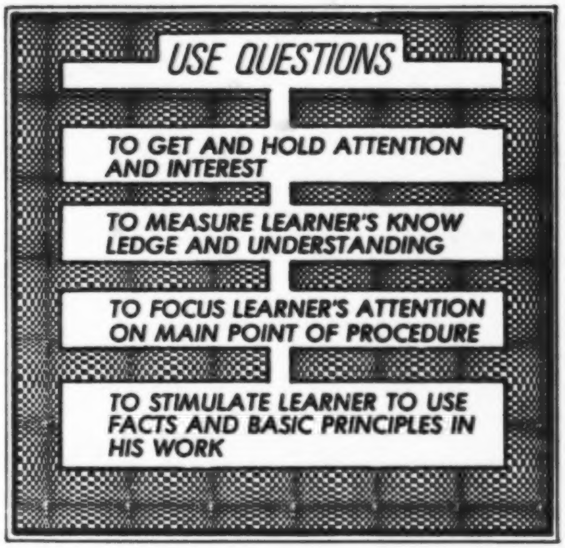

USE QUESTIONS
TO GET AND HOLD ATTENTION AND INTEREST
TO MEASURE LEARNER'S KNOW LEDGE AND UNDERSTANDING
TO FOCUS LEARNER'S ATTENTION ON MAIN POINT OF PROCEDURE
TO STIMULATE LEARNER TO USE FACTS AND BASIC PRINCIPLES IN HIS WORK

Figure 33

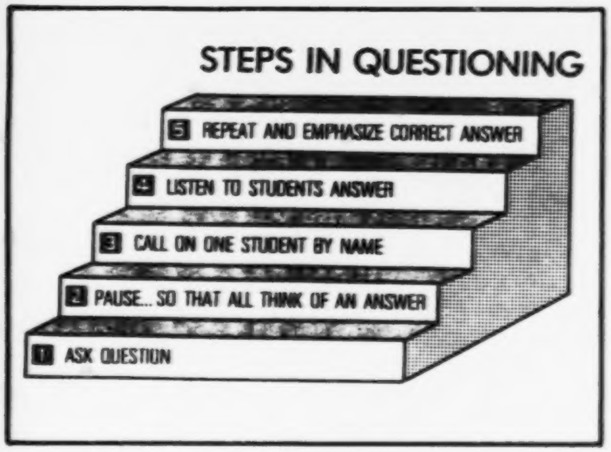

STEPS IN QUESTIONING
5 REPEAT AND EMPHASIZE CORRECT ANSWER
4 LISTEN TO STUDENTS ANSWER
3 CALL ON ONE STUDENT BY NAME
2 PAUSE... SO THAT ALL THINK OF AN ANSWER
1 ASK QUESTION

Figure 34

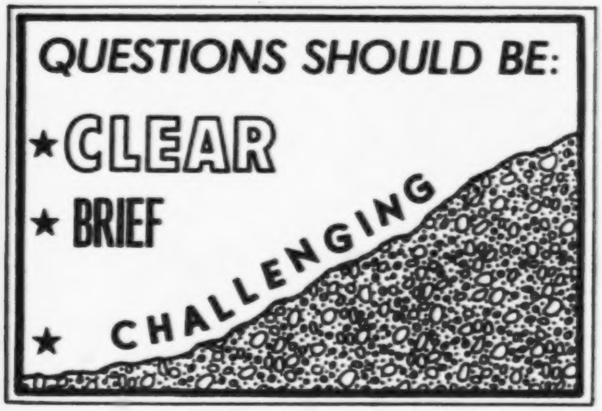


Figure 35

5. Ask the question first, causing everyone in the class to think about it, and then volunteer answers may be requested or definite individuals may be called upon. If certain members of the class volunteer more answers than others, the instructor will use good judgment by calling upon those who are more timid, thus getting them to participate.

6. Avoid calling on individuals in a definite order; such as alphabetically, the way the names appear on the roll book, or the way in which they are seated in the class. It stimulates more interest if questions are distributed at random over the class.

7. Avoid asking questions either orally or in written tests which may be answered by "yes" or "no" unless this is followed by the question "why" or "explain your answer." It is apparent that yes or no questions will encourage guessing and one might accidentally be right one-half of the time. It is always a good policy, if time permits, to take the opportunity to explain an answer, as this practice helps to fix it in the mind of the one reciting and to impress it upon other members of the class.

8. There are various methods of preparing written questions for testing the entire class. If special questions require complete statements for the answers, it makes more work for the instructor in grading and takes up more time. If, however, statements can be written requiring only one or two words to complete the meanings and which are to be supplied by the learner, it makes and easy test to give and to correct. This is called a "completion test", and additional details about this will be given later.

Showing and Illustrating. It is generally known fact that many learning impressions are received through the eye by seeing a task done or by seeing a picture or diagram. Telling is much more effective if it is accompanied by a good visual illustrating a point or points.

Illustration is the name given to the tool, or teaching methods, which the instructor uses to make ideas clear through the eye. Illustrations may by:

Chalkboard sketches or drawings

Charts or diagrams

Pictures, blueprints or working drawings

Motion pictures or slides

Video tapes

Computer material

Illustration is to be used when demonstartion is not practical, to vary the approach to teaching, to maintain student interest, and to facilitate learning. A few brief suggestions will be given about the use of each type of illustration.

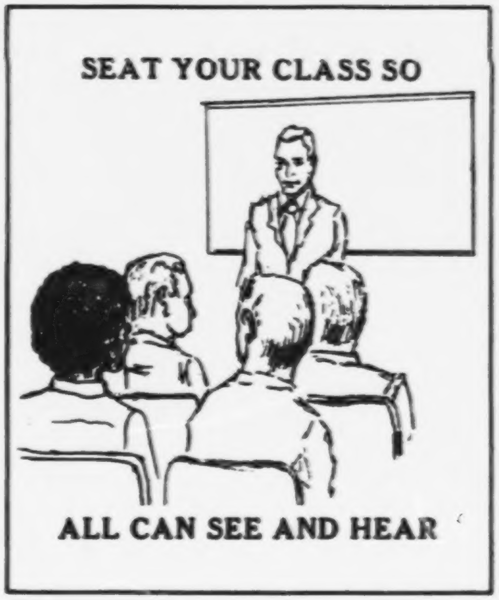

SEAT YOUR CLASS SO
ALL CAN SEE AND HEAR

Figure 36

Chalkboard sketches may be made either in advance of the class meeting or during the telling or lecture. Each of these methods has certain advantages. If made in advance, the sketch on the chalkboard may be carefully and accurately drawn, usually to scale, and of a size to be easily seen by the entire class. Small objects may be drawn to a large scale, making them easily understood and viewed. Likewise, large objects may be shown on a reduced scale, or portions of objects may be indicated which are of importance.

The advantage of drawing a sketch to accompany an explanation is that the ideas may be emphasized at the exact time necessary. The sketch may be developed as the explanation is made. A disadvantage is that such sketches must be rather hurriedly done in order not to scarifice or waste time, and hence, are usually not as accurate or as finished in appearance as if they had been made in advance. Two cautions are to be observed in using chalkboard sketches: First, if explanations of certain parts on the sketch are being made, these should be definitely pointed out at the time of the reference; and second, if explanation is being made at the time a sketch is being drawn, the instructor should be careful not to talk while facing the chalkboard. When referring to sketches, use a pointer and stand to one side so that everyone in the room may see the sketch.

Charts and Diagrams have many of the same advantages that are possessed by chalkboard sketches made in advance, except that they cannot be changed or altered as easily and quickly. An advantage is that if good charts are developed, they may be preserved and used from one lesson to the next or one class to the next. Cautions to be observed are the lettering, figures, and details on charts must be large enough to be readily seen by the entire class if the chart is to be used at the front of the classroom.

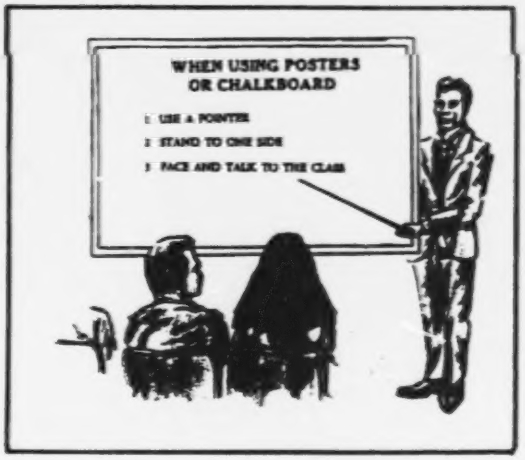


Figure 37

Pictures, Blueprints, and Working Drawings of objects or persons using tools or machines are frequently valuable and will save considerable explanation time. It is comparatively simple to show and use a picture that is large enough to be seen from all points in the classroom.

Motion Pictures and Slides, especially those with sound, are an effective teaching aid. Film and filmstrips are handled as if they were Stage II of the lesson plan. Whenever the opportunity presents itself, this excellent method of presentation should be used. Instructors should request the local school Audio-Visual Building Coordinator or the system-wide Audio Visual Coordinator to order film.

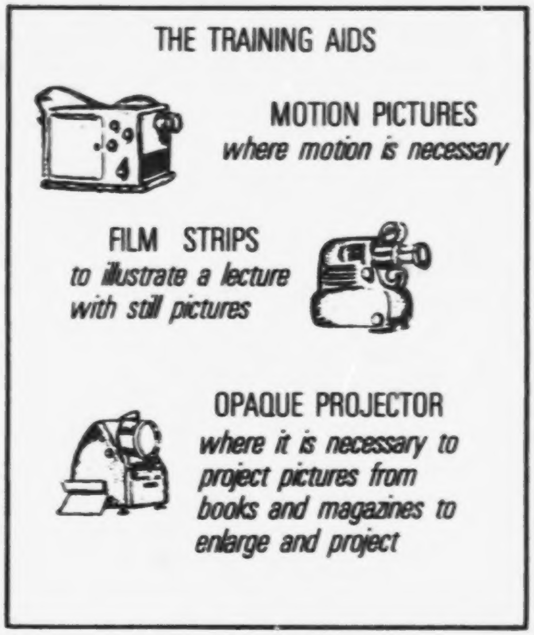


Figure 38

Demonstration and its essentials. Demonstration is the act of performing a process correctly for class members to observe so that they may learn how to do a job or task. Demonstration is done with the identical materials and tools that the learner will use. Demonstration includes the displaying of specimens or exhibits of completed projects, samples of materials, and tools to they may be inspected and identified. This method is most effective when explanations are made as the instructor performs. Since demonstration is one of the most important teaching tools, especially in vocational industrial occupations, a series of suggestions are given for performing a demonstration:

1. Plan the demonstration, step by step, from the analysis of a task to be taught.

2. Have all the tools and materials at hand in advance to eliminate delays after the demonstration begins.

3. Be certain all class members are located in such a position that they can clearly see every movement that the instructor makes.

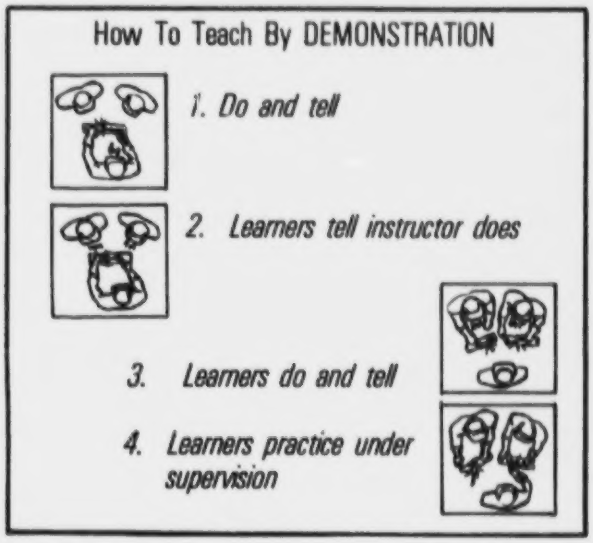

How To Teach By DEMONSTRATION
1. Do and tell
2. Learners tell instructor does
3. Learners do and tell
4. Learners practice under supervision

Figure 39

4. Prepare the students in advance by explaining what is to take place; call attention to each step at the point where emphasis is to be placed.

5. Direct attention to any task or step involving safety before performing it.

6. Do the task at normal speed so that learners can see what performance is expected.

7. When teaching a task, the instructor demonstrates slowly and deliberately. The principal point is to have the various tasks clearly seen and understood.

8. Explain each step as it is performed.

9. Provide students an opportunity to ask questions after each step.

10. Summarize the demonstration.

11. In the application stage:

    a. Ask questions.

    b. Have class members perform the task.

    c. Use a combination of questions and performances by different students.

Doing. Real learning is measured by the ability to do. If the lesson involves facts or principles, the learner should have a chance to demonstrate the proper use of the facts or the principles. If the lesson involves manipulative skills, the use of tools, machines, equipment, and materials, the lesson is not complete until the learner can perform the task unaided. Students learn by doing and they acquire both skill and speed by repeated practice.

Practice on the task. Practice on the task is the teaching tool most used to complete a lesson. The ability to observe a learner on the job, detect errors or omissions, to reinstruct the student in the essential points, and have the student master the process is the finest attribute of a successful vocational industrial teacher. The following are musts in observing practice on the task.

1. Observe closely each task performed. The object of this observation is to detect the point or points where the learner is having difficulty or may be performing contrary to instruc-

tions.

2. The learner should be able to do a task after receiving a complete lesson.

3. Stop the student from doing a process incorrectly and reteach if the need is evident. Otherwise, correct the process and allow the student to continue.

4. If the learner is unable to perform the task reteach, follow all the suggestions for effective demonstration as given on previous pages.

5. Let the learner tryout, making suggestions as the need arises until the task can be performed successfully.

6. If a learner calls the instructor saying, "I am stuck at this point," or "I don't know what to do next," first try to get the learner to decide what should be done by asking questions. Try to get the learner to think through the problem. If the instructor is successful in getting the student to think through the difficulty, this will help the student to develop the ability to make judgments and decisions.

The following cautions about observing practice on the task should be noted:

1. Avoid being abrupt or arbitrary when making corrections. Often it is not what one says, but the way one says it that causes people to take offense.

2. Be patient. Show no irritation if a learner does not seem to have grasped what was explained or does not remember something which was demonstrated. Perhaps in some particular the explana- was not clear or the demonstration was incomplete.

3. If several members of the class are found to be making the same error or to be "stuck" on the same point, to save time for both instructor and class, get this group together and reteach.

GIVE THE LEARNER CREDIT FOR GOOD WORK

1. point out work well done

2. praise students for honest effort

3. let them know that you are interested in their progress

4. precede reproof with praise for aspects of the work which are well done

Figure 40

4. Refrain from demonstrating with learner's materials if this will deprive the learner of the opportunity to have a doing experience.

5. Some of the most frequent errors detected in observing practice on the task are as follows:

a. Grasping or using a tool in the wrong manner.

b. Standing in the wrong positions relative to the work.

c. Having the work in the wrong position for doing the task.

d. Using the wrong tools for the task.

e. Using an improperly adjusted tools.

f. Using a dull tool.

g. Failing to observe safety rules and precautions.

6. When demonstrating a task the instructor is not to forget the left-handed person. Make certain that these students understand and are able to perform the task. Left-handed instructors must teach right-handed learners.

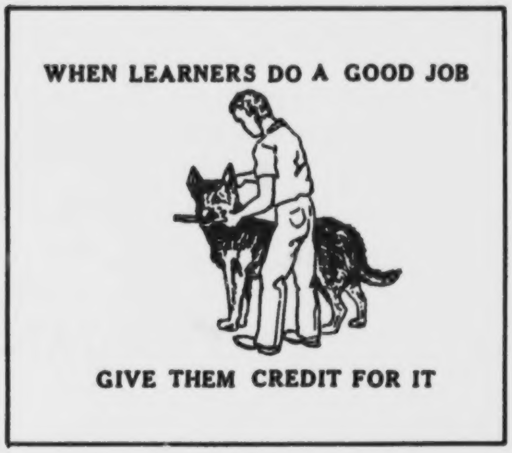

WHEN LEARNERS DO A GOOD JOB
GIVE THEM CREDIT FOR IT

Figure 41

7. Learners are not to be told that their project is wrong or that a job is unsatifactory without explaining why. Merely to say "This won't do, you've done it wrong. Go ahead and try it over again," is not good instruction. State what the error is and how it can be prevented on the next tyrout.

8. If the instructor finds a learner trying to perform a task in a different manner from that which has been demonstrated, first find out why this method is being used. If the learner thinks some other way is better, demonstrate the advantages of the method being presented. Instruct the learner to practice the method that has been demonstrated in order to develop proficiency in this method. If an alternate method has been discovered that is just as effective, compliment the learner.

9. Commend good work in a wholehearted manner. Give encouragement whenever real effort is being made and there is progress. It is frequently a fine stimulus to call the attention of the class to meritorious work by placing certain well-constructed projects on display with the name of the person who made it.

Instruction Sheets--Because of the differences in the background of the members of the usual lab class, and because of the difference in the rate at which they master skill and information, the teacher must use printed instruction sheets that will enable the student to make the maximum progress. Instruction sheets are written teaching aids which contain organized material for the use of the individual students. Instructional sheets may include instructional charts, pictorial illustrations, and diagrams. The job sheet, task sheet, information sheet, and assignment sheet are commonly used instruction sheets.

The job sheet is a written instruction sheet presenting directions, references, working drawings, and other information designed to assist the learner in mastering an assigned job. It is prepared by the instructor, meant to aid the student in doing the job. A job sheet contains the procedures for doing a job. It is built upon a series of processes or tasks which carry the job through to completion. (See Appendix, pp.74 and 75)

Job Sheets Contain:

INFORMATION	EXAMPLE
1. Name of Minor Block in which the job occurs	1. Bench Metal Work
2. Name of Job	2. Make a Drill Lip Gage
3. A working drawing	3. Blueprint or Drawing giving all needed information (See Appendix, p. 81)
4. Material	4. 1 piece 1/8" x 2" x 5" Band Iron
5. Tools and Equipment	5. Bevel Protractor, Scratch Awl
6. General Instructions	6. Write general instructions
7. Procedures and/or Tasks	7. a. Cut stock to length b. Remove all scale
8. Check points	8. Why is it important to keep file clean when draw-filing stock?

Task Sheet--The task sheet lists a definite set of steps and key points forming a "doing item"; it is generally considered the smallest practical unit for teaching trade work. A Job is made up of a number of logical and necessary tasks. (See Appendix, p. 76)

Job Plan Sheet--The job plan sheet is a procedure format to be filled out by the learner, listing in sequence the principle steps necessary to perform a job, as well as the necessary tools and materials, to guide the learner in doing the assigned task. When prepared by the student, the job plan sheet challenges the ability to analyze the job and plan the procedure. (See Appendix, pp. 137-138)

DISCIPLINE MANAGEMENT

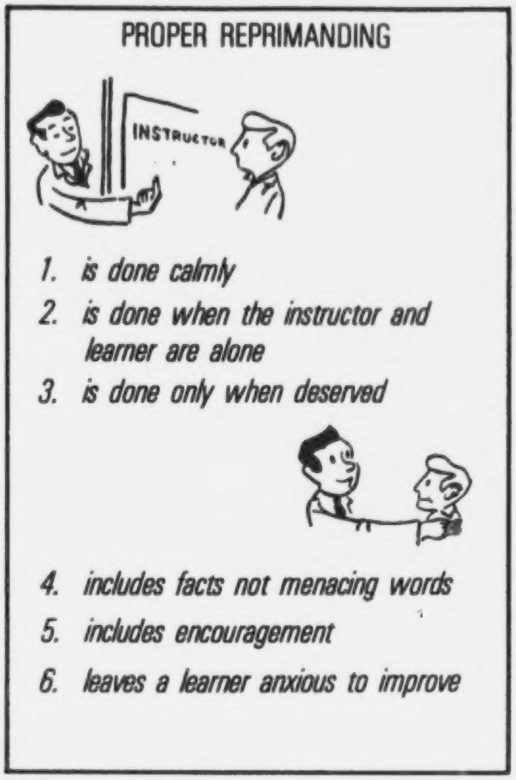
Preventive Discipline

The teacher will have to organize work and have assignments prepared that will give every student a specific job at all times. Benjamin Franklin said, "An idle brain is the devil's workshop." The need to keep young people busy is obvious.

Disciplining Students--Discipline is a matter of management. Students kept busy develop good work habits. Those who are permitted to loaf, start and stop as they please, soon learn that there is time to fool around, arrive late, or annoy others. To prevent such situations, the shop instructor must be the master in the management of shop groups.

When students break rules and regulations and disciplinary action becomes necessary, the teacher will do well to be calm and collected. Disciplinary action is not to be taken while feeling "hot tempered" or "ill." Try to get unruly students to see their own faults, and create in them a desire to correct or amend their ways. Certain students who refuse to conform should be sent to the administrator in charge of discipline. However, a shop teacher must make a concerted effort to cope with all problems before requesting help.

The teacher will do well to discuss special problems of this type with the administrator in charge to determine the policy of the local school. Any disciplinary action taken must follow the pattern acceptable to the school system.



PROPER REPRIMANDING

1. *is done calmly*
2. *is done when the instructor and learner are alone*
3. *is done only when deserved*
4. *includes facts not menacing words*
5. *includes encouragement*
6. *leaves a learner anxious to improve*

Figure 42

Some disciplinary actions are:

Warning group
Separating students
Warning individual of consequence
Having heart-to-heart talk
Taking away privileges
Keeping after school
Giving demerits
Dismissing from class

Safety--A shop instructor should be thoroughly sold on safety. Safety must be taught before permitting students to use and operate power driven machines. Safety education means an effective teaching program and an effective accident prevention program.

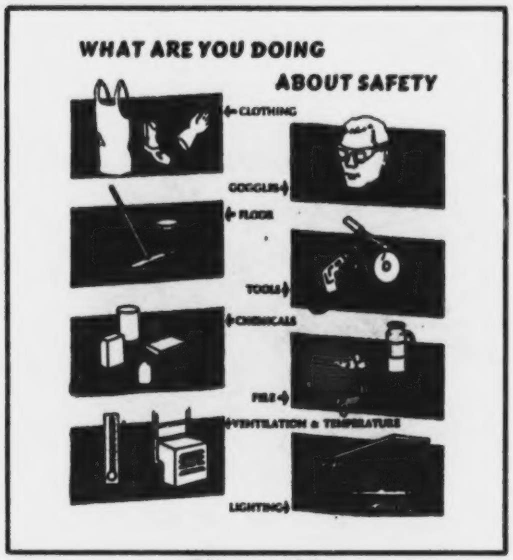


Figure 43

Figure 44

Shop talks on accidents and accident prevention posters showing the effects of failure to observe safety rules have their place in shop teaching. The surest way to prevent accidents is to instruct students so that correct procedures become automatic, and the student, through habit as well as judgment, maintains maximum safety.

The time to instruct students in the correct performance of tasks and in safe practice is when they begin. Otherwise, unsafe habits may develop. The time to set safety habits is when the learning processes begin.

Emphasis must be clearly placed on preventing injury by reducing hazards in every possible way. Students should be permitted to work in a congenial social atmosphere, but "fooling around" and "horseplay" are not to be tolerated. Some shop teachers make use of "safety engineers" appointed from the class members. The "safety engineer" checks and reports hazards of the shop and works out corrective measures. Battered cold chisels are reworked to make them safe. Guards are applied where needed; emery wheels are dressed; and goggles are kept clean and available to conform with the eye protection law.

Instructors are urged to contact the National Safety Council, Chicago, Illinois, for literature on shop safety. Tool companies and material manufacturers can be contacted for safety film, posters, and other materials. The shop teacher must set a good example for students, also, know safety and first aid. There is little excuse for a school shop being a hazardous place to work; the instructor is the key person in accident prevention.

Safety Check List--A shop teacher or an appointed student, safety engineer, should check on the following items:

1. All jewelry removed
    a. Finger rings
    b. Watches
    c. Neck chains
2. Proper shop clothing being worn
    a. Neckties removed
    b. Sweaters removed
    c. Short sleeves or sleeves rolled up
    d. Short or hair covered with protective gear
3. No "horseplay" taking place

4. Report and correct dangerous work habits or shop practices

5. Report and correct violations of known safety rules

6. Enforce shop rules concerning:

   a. Poking
   b. Running
   c. Throwing objects
   d. Distractive talking
   e. Playing

7. Explain and point out the why of all safety rules

8. Worn, broken, dull or mushroomed tools are not being used

9. All students' work indicates a safety consciousness

10. Watch for improper use or abuse of equipment

11. Inspect tools daily for hazards

12. Check setup before starting machines

13. All injuries, no matter how slight, must be properly treated

14. Check and report daily the condition of first-aid supplies

15. All guards are on machines

16. Students are not to leave machines in operation

17. Only authorized students are to operate machines

18. Students are to stop machines and turn off all power before cleaning or oiling machines

19. Fire extinguishers are to be checked for service and proper location at the beginning of each class

20. Shop is clean and in order

21. The floor is to be clear of all items

22. Long stock and other barricades are to be properly flagged

23. Oily rags, oily spots on the floor, and other like hazards are quickly and properly removed

24. Protruding nails or other sharp objects are to be quickly and promptly removed

25. Eye protection devices are to be worn by all learners when necessary to protect the eyes from foreign matter

26. Toole rests are to be properly adjusted on grinders

27. Work is not to be held in the hands while it is being processed on a machine

28. Chipping is to be done into a baffle and away from fellow workers

29. Burred, chipped, or cracked hammers are not to be used

30. Volatile and caustic liquids are to be kept in their proper containers and have a specific, approved storage space

This list of items to check are suggestions for teachers to use in the preparation of their own safety rules and regulations for the safe and successful shop.

First Aid--The prompt treatment of injuries should be possible if the necessary forethought is given to first-aid facilities. Most shops have a first-aid kit even if a first-aid room is available to the entire school. This is a matter upon which local school administration will pass judgment.

If a first-aid kit is available to the shop teacher, it should be kept clean, sterile, and adequately stocked. The shop teacher should have taken a Red Cross first-aid course. If the instructor has not had a training course, it should be taken at the first opportunity. A Red Corss first-aid booklet is available in most localities. The instructor can study this book, work out the problems, and become proficient in the handling of first-aid work.

In the absence of information about first-aid supplies, the following list gives the approved American Red Cross items to be included in a shop kit:

1 American Red Cross Textbook

1 Package of six paper cups

1 Package of 50 adhesive compresses

1 Bottle Mercurochrome

1 Bottle aromatic spirits of ammonia

1 Roll bandage, 2-inch

1 Roll bandage, 1-inch

1 Tube Tanipaste, 1 1/2 ounce

Some additional items might be needed in certain shops. A machine shop, for instance, should have a tourniquet available. If a school has several shops, a stretcher might be kept available, and a first-aid room should be equipped with a cot upon which a student might be placed to avoid fainting or injury resulting from fainting.

Shop teachers will find by experience that keeping a first-aid kit stocked, clean, and ready for emergency use in one of the biggest problems in first-aid. A second problem may be that of the sudden and unexpected fainting, which may affect a student with a very minor injury. It is well to have a capable student in the group to act as a first-aid assistant. This person might be a Scout who has had first-aid training. It would be this person's job to step to the first-aid kit when a student is injured and either to dress the wound while the instructor stands behind the injured person or to stand behind the injured person while the instructor does the first-aid job. This arrangement prevents injury to an individual if he should faint while being treated.

Some shops have a first-aid stool upon which the victim sits while first-aid is being administered. Falling off the stool may be as serious as falling from a standing position, and the first-aid assistant can perform the same function whether a stool is used or not.

In any case, when an emergency arises, the administration must be notified of the situation. Also, where a school nurse is available, request this person's assistance. **THE TEACHER IS NOT TO ADMINISTER MEDICATION OR PRESCRIBE TREATEMENT.**

In all cases of first-aid conform to the humanitarian act and to the state law known as the Texas Good Samaritan Law. H.B. 100 57th Texas Legislature, Regular Session, 1961, codified as Article 1a, Vernon's Civil Statutes. (See Appendix, pp. 125-130)

CLASS ROUTINE

An established procedure must prevail for each shop or class session. Students must be required to assemble punctually in the classroom, in an orderly fashion, and await for further instructions. The beginning of class should include roll check, school and/or class announcements, and instructional lessons or class assignments. Students should be given an opportunity to ask or discuss problems concerning their assignment. Details of assignments and routines should be worked out so that each student knows their assignment, and can proceed with carrying out that assignment.

Assignments which occur daily are posted and a student held accountable for a task. It is easy to assign duties to provide each student with specific tasks. Students enjoy the responsibility, and they respect the organizational ability of an instructor who can make assignments that are equitable. With routine established, a rapid check following the clean-up period makes possible quick student dismissal.

Planning the Work

It is impossible to meet a group and teach a successful lesson without first planning carefully just what is to be said and done. Students like manipulative work, and it is wise to make use of this desire by getting them started in the shop as soon as possible. Lectures, demonstrations, or other nonparticipating activity should be scheduled when the need arises. Perhaps 15 to 30 minute periods for this activity will be sufficient. Charts, diagrams and other visuals will be helpful in putting across a message within this period of time.

Planning the first meeting should include orientation of the students to the shop and should arouse interest and develop an understanding of the shop and its functions. A suggested orientation may include the following and other items that the instructor may feel to be of importance:

1. An overview of the course including objectives, aims, outcomes and course philosophy.

2. A description of the jobs and the skills to be learned with the accompanying knowledge. This information is to be furnished the student in a topic outline form.

3. A discussion of the importance of skills to the learner.
4. An explanation of the shop rules and regulations, and why the rules have been set up.
5. An explanation of the school and shop schedules.
6. An explanation of the marking system and checking points of jobs.
7. An explanation of the testing and grading systems.
8. The assignment of shop responsibilities--clean-up and tool checking.
9. The assignment of leadership--superintendent, foreman, etc.
10. The assignment of work stations.

New terms and the names of machines must be given careful attention during the orientation period. These terms will have to be mentioned many times so that students will learn to recognize the terms and to associate them with the proper objects. The term "adjustable wrench" has many different meanings to new students; therefore, the shop teacher must designate the type adjustable wrench, such as "Crescent wrench" or "Stillson wrench" because they are two distinct and different tools.

The same attention must be given to terms in all occupations. When the cosmetologist refers to a comb or razor make certain that the student is informed as to type and kind. Frequent testing should reveal the students' grasp of the terminology of the occupation.

Be sure that all safety points have been clarified with students before they are permitted to operate machines and tools. Teachers should have shop safety rules duplicated; a copy presented to each student and posted in strategic places throughout the shop. The students are required to study and react to each safety rule. It is necessary that the teacher teach the rules and test students for clarification and understanding. A file of each students test of safety should be kept to verify safety instruction.

TEACHING ACTIVITY

Starting a Class--The plan for the first day will depend upon the time available. If a short period is scheduled, it may be used for gathering personal data about the students. The main office will inform the teacher of the information it requires, and the teacher must determine what additional information is needed.

Any time remaining after gathering data on students should be utilized to inform the students as to the type of shop clothing to be worn, tools or materials to be brought to class, or financial outlay needed for materials or supplies.

A shop tour should be made in which the instructor names machines, hazards, and danger points and locates supply storage.

If time permits and facilities for storage are available, material may be withdrawn for the first job. This should be delayed until the second meeting if no place for keeping supplies is available to the group. Instead of students working on materials the first day, the instructor may, if time permits, present a demonstration of the starting steps which the student will do as initial activity.

The First Day--A good start the first day will prove helpful to the teacher. All teachers may not use the exact procedure given here, but the following steps may be typical of the first day:

1. Specify to the students the manner of entering the shop in an orderly fashion the first day and in the days that follow.
2. Students may be permitted to examine the machines of the shop, but care must be exercised in making certain that they do no harm to themselves and do not damage the equipment.
3. Work station, locker, or other assignments may be made at this time.
4. Call the group together and explain rules and regulations--explain why rules are necessary. Keep rules brief and to the point; also, keep rules few in number but enough to adequately cover the situation.
5. Explain shop routine including:
   a. Locker space, care of clothing and personal possessions.
   b. Kind and type of shop clothing to be worn and its maintenance.
   c. Method of issuing and returning tools and materials.
   d. Work to be undertaken.
   e. Methods of housekeeping.
6. Have job and task sheet available and make assignments of jobs.
7. Take students through all preliminaries of procuring stock, making out bill of material, withdrawing tools, etc. Go as far with this demonstration as time will permit.
8. Make a written record of assignments made, such as, bench, machines, locker, or supervisor.
9. Get the class into the habit of starting work early. Five minutes should be ample time for the group to get their jobs started.
10. Close the shop promptly with little loss of time. Ten minutes should be time enough allowed for cleaning benches, machines, and floors and putting away all tools, stock, and equipment.

In the days that follow, develop a routine which makes maximum use of students' time. Additional items to be added in the days that follow might be:

1. Become acquainted with all members of the group as quickly as possible.

2. Have a place for everything and make certain that students learn the location of all tools, supplies, and equipment. Have the students return all unused materials and tools promptly.

3. Establish class standards of quality and quantity of work early in the semester.

4. Put into practice the five stages of teaching. Use demonstrations, mock-ups, samples, illustrations, and pictures to help students visualize the necessary steps and procedures.

5. Be firm, but be pleasant enough to attract students and fellow teachers. Read all available material in the field to be taught. There is much written on the subject and a good teacher can do mush to improve.

6. Plan work on a day-to-day basis. Have the daily plans laid out for several days in advance. Plans may be altered as conditions demand.

7. Make a brief talk or demonstration when necessary to add to the students' knowledge and skills of the trade.

8. Have students work from job and task sheets at all times. Have a job sheet on every machine or at each work station where a student has an assignment.

9. When the students are started on their jobs, circulate throughout the shop to assist, correct, and encourage all students.

In the days which follow, the instructor can select and combine the above steps and work out a teaching plan which will be fairly routine.

The First Week At the end of the first week, the instructor will find several tasks needing attention. These items will be reviewed. Not all items can be listed because of local regulations and requirements.

The teacher must do the following at the end of the first week.

1. All tools and equipment should be checked, and anything that has been damaged during the first week of shop work must be put in working order.

2. Any extra clean-up work around the shop must be taken care of at this time.

3. Supplies must be checked and requisitions placed for any items which have been drawn upon too heavily to last out the term.

4. Progress records are brought up-to-date, and any grading not done on a day-to-day basis must be marked up at this time.

5. Funds collected must be turned in at the end of each school day.

6. First semester organization report must be prepared and turned in to the local administrator, responsible for vocational industrial education, for his signature. The report is then forwarded to the Trade and Industrial Area Specialist.

7. Paper work for the local school must be prepared.

8. Plans must be made for the week ahead and plans already made must be adjusted for the new week.

The First Month. All reports and records, such as, progress charts, grades, orders, requisitions, etc. must be checked for completeness.

1. Equipment, tools, supplies and machinery should be checked, and needed repairs and replacements should be made.

2. All funds should be deposited in the main office and all receipts should be filed for future use.

3. Lesson plans should be reviewed, demonstrations planned, sample pieces made, and reading and perfecting teaching techniques continued.

4. Shop schedules must be coordinated with activities of the school. For instance, testing can be coordinated with six weeks grades or other grades.

5. Students needing help should be given additional instruction on jobs and through a discussion of their progress.

The First Semester. Grades, progress records and other required paper work should be kept up-to-date to meet deadlines. One way to indicate an ability to organize is to have grades and paper work up to standard for the hour due.

1. This is the time to re-order supplies and replenish stock.

2. Equipment, tools and machines are to be put in shape for the new semester.

Figure 45

3. Testing and other accepted practices of the shop program are coordinated with the regular school system.

4. All marks on permanent records are posted, fees collected and turned in to the main office, and incomplete jobs finished to permit grading.

5. All preparations for the next semester should be made well in advance of the actual starting of the work. Orders for materials, tools, and supplies should be

placed early to insure that materials will be on hand to begin the semester.

The First Year. Inventories should be brought up-to-date. The shop should be thoroughly cleaned, painted, and put in good condition.

1. All records, reports, grades, and permanent files must be completed to the satisfaction of the local administrator.
2. All materials, tools, and equipment should be inventories and inspected for condition or loss.
3. A budget for the following year should be prepared. This budget should contain items for teaching in the classroom and materials and supplies to be used in the shop, including an amount budgeted for maintenance and repair of machines, equipment and tools.
4. Requisitions should be placed for materials and supplies for the coming year.
5. Machines put in good repair should be coated with rustproofing material to keep finished surfaces well protected during the summer months. Small tools and fine tools should be cleaned, oiled and rustproofed.
6. All rags, waste, shavings, or other combustible materials should be removed from the shop and from the school building.
7. Cabinets should be cleaned, painted if necessary, and locked.
8. Keys should be marked and turned over to school authorities who will remain on duty during the summer months.
9. All local requirements set forth by the administrator in charge should be carried out. The shop teacher should leave the shop in excellent condition when closing for the summer months.

RECORDS AND REPORTS

State Reports

The operation and financing of vocational industrial shop classes is no different from the operation of regular academic classes; however, certain reports must be made to justify the operation of the class and the allocation of the vocational teacher's salary. Since coordination of the Occupational program is the responsibility of the Associate Commissioner for Occupational Education and Technology, it is imperative that he have some information concerning what is taking place at the local level.

The records and reports requested by the Trade and Industrial Education Division of The Texas Education Agency are few in number and require very little of the instructor's time when they are completed according to schedule. Three of the most common reports required are the Vocational Education Data

System (VEDS), Vocational Education Evaluation System (VEES), and the Unit Utilization Report. These reports are usually sent to the school administrative office by the state education agency. The procedure for completing and filing these reports will vary with different schools.

Local Reports and Records

The number and type of reports required of a teacher will vary with the school district. In general, the most common can be grouped as, staff-personnel records, pupil-personnel records, financial records, and material and equipment records.

Staff-Personnel Records include records of employment of the teacher, including educational background, work experience, date of employment, promotions, salary agreements, etc. Normally, these records will be kept in the school administrative office with the teacher keeping a copy. An annual update is maintained of the teachers record.

Financial Records include budget estimates and appropriations for maintenance, repair, or replacement of equipment and tools. The teacher should maintain record of all requests for purchase of items listed in the budget. Included in financial records are the materials and supplies that are resold to the student. This is usually referred to as the revolving account. This account will show the amounts and kinds of material on hand, dates it was sold, cost, to whom it was sold, and money that remains in the account.

Pupil-Personnel Records not only include shop management assignments and safety records, but include such items as progress records, grades, and the students competency profile folder.

Progress Records. A sample progress chart is shown in the Appendix, pp. 77-78, to give instructors an opportunity to see what can be done by way of motivating students through the use of progress records. In the event no progress record plan exists locally, it is urged that a system be set up at once. The progress record should be posted in the shop for everyone to see.

Grades may be coded, but they should not be posted in a manner which will have an adverse effect upon student morale. The teacher should also be aware of the "open records law" which prohibits making public students grades without the students permission.

Various types of marking systems are used for progress records. Some instructors like to use a square, one line or one-quarter of which parallels the student's progress. Once the job is started, the instructor draws the first line of a small square. When predetermined checking levels are passed, two additional lines forming three-fourths of the square are drawn in. When the job is completed satisfactorily, the last line is drawn in.

Under such a plan the progress chart might look like the one in the Appendix, p.78 . A similar chart might be worked out for the related-subject material presented by the shop teacher. Objective, essay or performance tests are used to assist in determining student grades.

Some instructors use a series of dots to indicate the grade given a student.

Others prefer to keep a grade book or a progress folder in which they enter a grade for the completed job. The grade book should not be available to the students. However, individual grades are the concern of each student and individuals should be made aware of their progress. The grade book parallels the progress chart in that as a job is completed, a grade is entered which represents the quality of the work. Teachers are inclined to neglect the progress chart, but if students are informed that as jobs are completed, credit for proficiency will be shown on the chart, they will insist upon this open recognition. With the progress chart, a learner may complete a unit of work as rapidly as possible and may move on to new jobs.

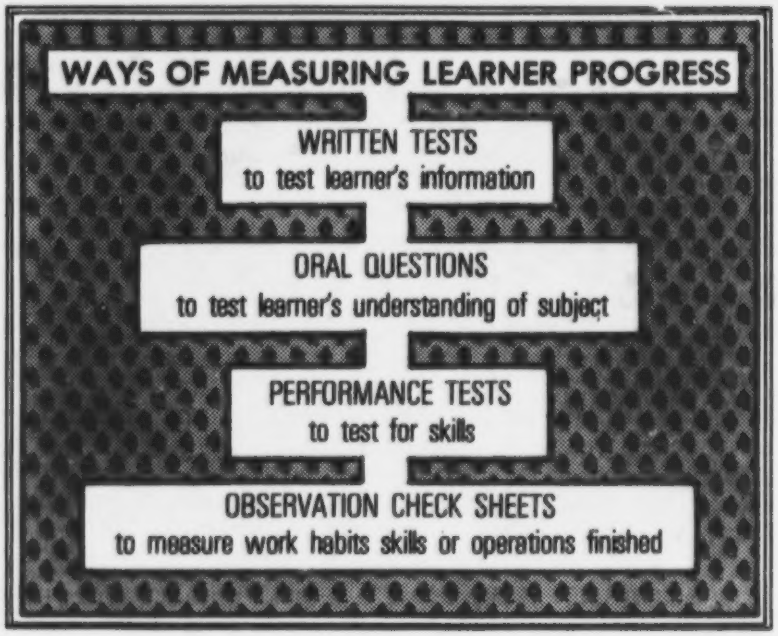

WAYS OF MEASURING LEARNER PROGRESS
WRITTEN TESTS
to test learner's information
ORAL QUESTIONS
to test learner's understanding of subject
PERFORMANCE TESTS
to test for skills
OBSERVATION CHECK SHEETS
to measure work habits skills or operations finished

Figure 46

Grades. The evaluation of a students progress can be determined by tests, both written and oral, performance tests and observation check sheets. (See Figure 46)

Other factors that the instructor may use in determining the students grades are:

Students ability to make judgements and decisions;
Quantity of work produced;
Quality of work produced;
Speed and efficiency of work;
Initiative and creativity; and
Attitude.

The instructor's rating scale must fit the pattern for grading maintained by the local school policy. It is the responsibility of the instructor to know the local grading system and conform to this pattern. Grades must never be arrived at by guessing. In all fairness to the students each instructor must have a scale by which students' work can be evaluated. This grading scale must be of such a nature that personalities can not and will not influence student grades.

Teachers must have predetermined standards of quality which, when met, should automatically result in certain grades being given. An instructor must be fair with students. The giving of credit for unsatisfactory work tends to demoralize the student body. One of the many desirable qualities of a good instructor is the fair treatment of all students.

Figure 47

Competency Profile Folders. The competency profile folder differs from the progress record in that it identifies those tasks that a student is to learn in a program and how competent the student is in the performance of that skill. In addition to the competency listings, it contains student personal information, type of instructional program, on-th-job training and work experience, and the follow-up record. This folder becomes a permanent record for that student upon completion of the program. A sample competency profile is shown in the Appendix, pp.139.

APPENDIX

BIBLIOGRAPHY

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Storm, George, Managing the Occupational Education Laboratory, Prakken Publishers, Inc., Ann Arbor, Michigan 48103. ISBN-0-911168-53-2 (paper).

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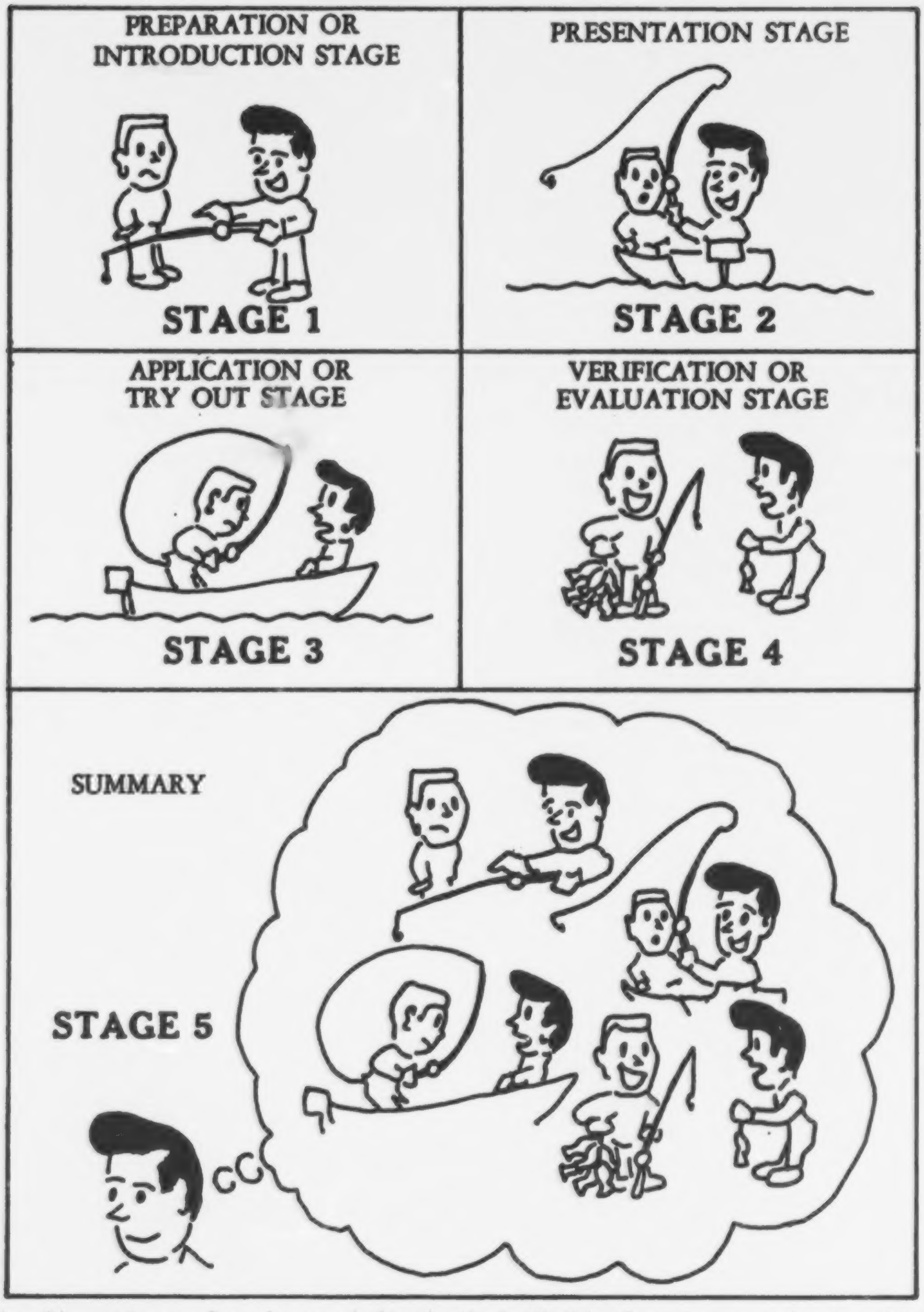
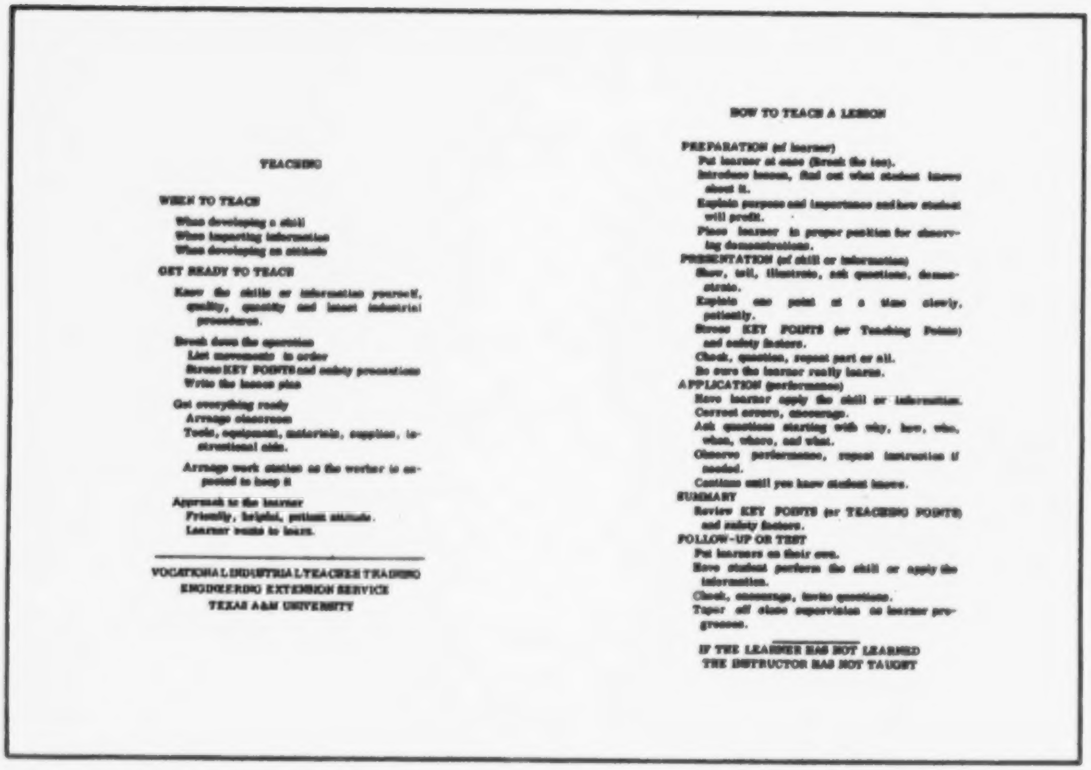
Professional teacher organizations such as the Texas State Teachers Association, American Vocational Association, and Texas Industrial Vocational Association include the cost of their usual publications in their annual dues, and there is no better source of authentic information concerning the teaching professions than the articles that are found in these publications.

THE FIVE-STAGE LESSON


PREPARATION OR INTRODUCTION STAGE
STAGE 1
PRESENTATION STAGE
STAGE 2
APPLICATION OR TRY OUT STAGE
STAGE 3
VERIFICATION OR EVALUATION STAGE
STAGE 4
SUMMARY
STAGE 5

The five-stage plan is used for both individual and group instruction.

Figure 48



TEACHING

WHEN TO TEACH

When developing a skill
When imparting information
When developing an attitude

GET READY TO TEACH

Know the skills or information yourself, quality, quantity and latest industrial procedures.

Break down the operation
  List movements in order
  Stress KEY POINTS and safety precautions
  Write the lesson plan

Get everything ready
  Arrange classroom
  Tools, equipment, materials, supplies, instructional aids.

Arrange work station as the worker is expected to keep it

Approach to the learner
  Friendly, helpful, patient attitude.
  Learner wants to learn.

VOCATIONAL INDUSTRIAL TEACHER TRAINING
ENGINEERING EXTENSION SERVICE
TEXAS A&M UNIVERSITY

HOW TO TEACH A LESSON

PREPARATION (of learner)
  Put learner at ease (Break the ice).
  Introduce lesson, find out what student knows about it.
  Explain purpose and importance and how student will profit.
  Place learner in proper position for observing demonstrations.
PRESENTATION (of skill or information)
  Show, tell, illustrate, ask questions, demonstrate.
  Explain one point at a time slowly, patiently.
  Stress KEY POINTS (or Teaching Points) and safety factors.
  Check, question, repeat part or all.
  Be sure the learner really learns.
APPLICATION (performance)
  Have learner apply the skill or information.
  Correct errors, encourage.
  Ask questions starting with why, how, who, when, where, and what.
  Observe performance, repeat instruction if needed.
  Continue until you know student knows.
SUMMARY
  Review KEY POINTS (or TEACHING POINTS) and safety factors.
FOLLOW-UP OR TEST
  Put learners on their own.
  Have student perform the skill or apply the information.
  Check, encourage, invite questions.
  Taper off close supervision as learner progresses.

IF THE LEARNER HAS NOT LEARNED
THE INSTRUCTOR HAS NOT TAUGHT

This illustration is the front and back of a reminder card used by many successful vocational industrial instructors. It tells how to use the five stage plan when teaching.

Figure 49

BEST COPY AVAILABLE

SAMPLE FORMAT

INSTRUCTOR'S PLAN
INFORMATIONAL LESSON

Major Block________
Lesson____________

SUBJECT:

AIMS (OR PURPOSE):

TEACHING AIDS:

MATERIALS:

REFERENCES:

PREREQUISITE EXPERIENCE
OF THE LEARNERS:

I. PREPARATION (OF THE LEARNER - MOTIVATION)

Figure 50

II. PRESENTATION (OF THE INFORMATION)

INSTRUCTIONAL TOPICS AND TEACHING POINTS	THINGS FOR STUDENTS TO DO THINGS FOR INSTRUCTOR TO DO OR SAY

III. APPLICATION (*DRILL, ILLUSTRATIONS, ANALOGIES, ORAL QUESTIONS OR ASSIGNMENTS,* MAKING INVESTIGATIONS OR EXPERIMENTS, NOTE TAKING, MAKING SKETCHES, PARTICIPATING IN DISCUSSION.)

IV. VERIFICATION AND/OR EVALUATION (FINAL CHECK ON STUDENT'S COMPREHENSION OF MATERIALS PRESENTED.)

V. SUMMARY (GIVE A BRIEF ACCOUNT OF EACH TOPIC REEMPHASIZING THE IMPORTANT POINTS. THIS SUMMARY MAY BE GIVEN AT ANY PLACE IN THE LESSON THE TEACHER FEELS WILL BE PROFITABLE TO THE STUDENTS.)

SUGGESTED READING FOR STUDENTS:

THE NEXT LESSON IS:

SAMPLE FORMAT

INSTRUCTOR'S PLAN
SKILL LESSON

Major Block______
Lesson__________

TASK:

AIM OR PURPOSE):

TOOLS AND EQUIPMENT:

MATERIALS:

TEACHING AIDS:

REFERENCES:

PREREQUISITE EXPERIENCE
OF THE LEARNERS:

CHECKING STANDARDS:
1.
2.
3.
4.
5.

I. PREPARATION (OF THE LEARNER - MOTIVATION)

Figure 51

II. PRESENTATION (OF THE SKILLS)

STEPS	KEY POINTS (THINGS TO REMEMBER TO DO OR SAY)

III. APPLICATION (PRACTICE BY LEARNER UNDER CLOSE SUPERVISION.)

IV. VERIFICATION AND/OR EVALUATION (A CHECK ON STUDENT'S ABILITY.)

V. SUMMARY (TELL THE STEPS OF PROCEDURE AS TO WHAT, HOW AND WHY. REVIEW CHECKING STANDARDS. THIS SUMMARY MAY BE GIVEN AT ANY PLACE IN THE LESSON THE TEACHER FEELS WILL BE PROFITABLE TO THE STUDENTS.)

SUGGESTED READING FOR STUDENTS:

THE NEXT LESSON IS:

SAMPLE FORMAT

Key to Course
Outline

JOB SHEET
IN

____
(Name of Minor Block)

NAME OF JOB:

(PLACE DRAWING HERE OR ON A SEPARATE SHEET)

MATERIAL:

TOOLS AND
EQUIPMENT:

GENERAL INSTRUCTIONS:

PROCEDURE
AND/OR
TASKS:

CHECK POINTS:

Figure 52

SAMPLE

JOB SHEET
IN
LATHE WORK

NAME OF JOB: Make a Carbon Steel Center Punch

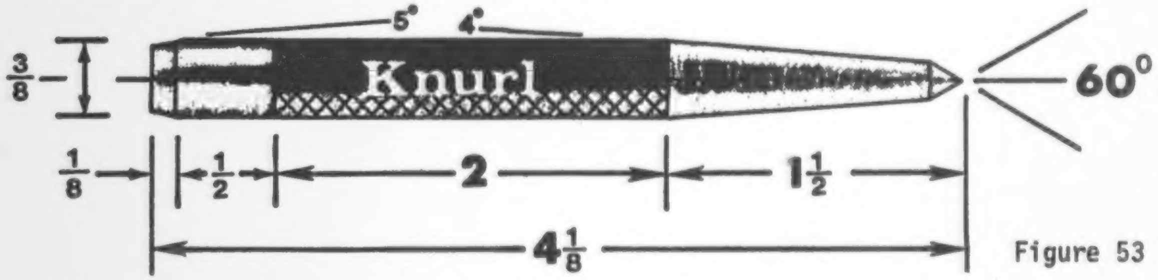


Figure 53

MATERIAL: 1 piece 7/16" x 4 3/16" water-hardened carbon tool steel.

TOOLS AND EQUIPMENT: Engine lathe, lathe tool board, right-hand turning tool bit, oil can, wiping cloth, lathe file, emery cloth, knurling tool, hardening furnace, quenching tank with water.

GENERAL INSTRUCTIONS: Before beginning this job, it will be well to review Information Sheet No. _____ on Principle of Knurling. Also, before Task No. 13 is begun, study carefully Task Sheet No. _____ on Harden and Temper Tool Steel.

PROCEDURE AND/OR TASKS:

1. Chuck and true stock, allow 3" to project beyond the chuck.
2. Face end.
3. Turn outside diameter to drawing specifications.
4. Knurl body.
5. Set compound rest to 5° and turn bevel on head.
6. File and polish end.
7. Reverse job in chuck, allow 1 3/4" to project from jaws.

   NOTE: Protect finished portion of work with padding.
8. Set compound rest to 4° and turn tapered portion work to required length.
9. File and polish tapered portion of punch.
10. Set compound rest to 30° and turn 60° point.
11. File and polish end.
12. Remove from chuck.

CHECK POINTS: Before proceeding further, have your instructor check the work.

13. Harden and Temper. (See operation sheet: How to Harden and Temper Tool Steel.)
14. Polish.

TASK SHEET SAMPLE FORMAT

TASK:

JOB:

OCCUPATION:

TOOLS AND
MATERIALS
NEEDED:

TASK BREAKDOWN:

STEPS	KEY POINTS
SKETCHES:	
REFERENCES:	

Figure 54

PROGRESS CHART

CLASS ______________________ INSTRUCTOR ______________________

		MACHINE SHOP, Lathe																						
		Cut Stock	Center Stock	Face	Straight Turn	Grid Threading Tool	Cut N.C. Threads																	
	NAME	1	2	3	4	5	6	7																
1	Day, Mark	□	□	□	□	□	□																	
2	Duncan, Joseph	□	□	□	□	⊏																		
3	Ellis, Edward	□	□	⊏																				
4	Johns, Raymond	□	□	–																				
5	Kaye, Walter	–																						
6	Louis, John																							
7	Morris, Ray																							
8	Moore, Earl																							
9	Mann, Charles																							

Figure 55

		Cut St	Center	Face	Straight Tu	Grid Thread	Cut N.C. Thre
	NAME	1	2	3	4	5	6
	ark	□	□	□	□	□	□
	ncan, Joseph	□	□	□	□	□	
	Ellis, Edward	□	□	Γ			
	Johns, Raymond	□	□	–			
5	Kaye, Walter	–					

Sample Progress Chart

Note - Any code for checking student's work may be used.

PROGRESS CHART

CLASS ________________________________ INSTRUCTOR ________________________________

Figure 56

A SIMPLE INVENTORY SYSTEM FOR MATERIALS AND SUPPLIES

Vocational industrial training shops are charged with the responsibility of maintaining an inventory of materials and supplies. This is a necessary duty. In order to maintain good organization and management the teacher must keep records.

1. Shelves, bins, stalls, cabinets, etc. are marked, and materials or supplies are placed in storage in their marked place.
2. Maintain a card index of 3 x 5 cards for each shelf, bin, stall, cabinet, etc.
3. 3 x 5 cards are to have a place for four entries.
   a. Items and shelf, etc. are to correspond as to name and markings.
   b. Date items were entered on card and stored.
   c. Item quantity on arrival and stored.
   d. Number of items checked out and date.
4. As material and supplies are removed from storage the amount removed is deducted from the total and dated. This maintains a running inventory as well as keeping the teacher informed as to when to order.
5. When the balance gets to a predetermined number enter the item on the requisition for ordering.
6. After a period of time the card index system can be used as a measuring stick to determine yearly needs for all items of material and supply.
7. This is a method used by large supply houses and automotive parts dealers, and it has proven invaluable to these industries.

Local Multiple List Textbook Committees

The board of education of each school district will appoint a local multiple list textbook committee on or before December 15 of each year to review and select from the list of textbooks adopted by the State Board of Education books for use by the local school districts.

Vocational Industrial shop teachers may likely be apopinted as members of such a committee or as consultants if textbooks in their field are up for adoption. Teachers should become thoroughly familiar with the contents of this communication in order to help prevent unnecessary complications and delays in selecting and securing textbooks for the vocational industrial program in the school.

Sample Copies of Vocational Industrial Textbooks--Schools are eligible to requisition sample copies of State-adopted textbooks for review by the Local Multiple List Textbook Committee for only those categories in which they operate, or will operate approved vocational industrial shop units.

Example: A school with an approved unit (or half unit) of Sheet Metal may requisition sample copies of all five books adopted under the category Metal Trades. The school cannot, however, receive sample copies of any other multiple lists of textbooks in any other category unless it operates, or is approved to operate, a new unit listed under the category.

New Vocatinal Industrial Units--Schools to which new industrial vocational units haven been allocated or which are committed to applying for one or more new units in vocational industrial education may requisition sample copies of textbooks on multiple listings for which they are eligible. The deadline for selecting textbooks for such new units is March 31.

Selection of Textbooks for Vocational Industrial Education

Practically all multiple listings of textbooks in the Catalogue of Current-Adoption Textbooks are by subjects. A school, then, may select a textbook for various subjects from a multiple list of from two to five textbooks. This is not necessarily true in the case of vocational industrial education. There is no multiple list adopted for each of the some 38 vocational industrial subjects taught. Instead, like or kindred subjects are grouped into one category for which a multiple list of textbooks have been adopted. In most instances, all titles in the multiple listing for a given category will be needed in a general type shop program. For example, all five textbooks listed under Metal Trades will be needed and should be adopted by the local textbook committee.

SUGGESTIONS FOR TEACHING WITH THE OVERHEAD PROJECTOR

WHAT TO DO BEFORE CLASS ASSEMBLES

I. Plans for Each Lesson.

- A. Transparencies developed or sketches made for transparency development in class.
- B. Transparency use planned.
- C. What is to be said about each transparency?

II. Arrange the Transparencies in the Proper Order for Showing.
III. Set Up Overhead Projector and Screen So Everyone Can See.
IV. Have a Spare Blub and Marking Pencils on Hand.
V. Preview Transparencies Beofre Class with Lesson Try Out.

WHAT TO DO WHEN CLASS ASSEMBLES

I. Prepare the Learner.

- A. Introduce the lesson.
- B. Explain to the students how they will profit from the transparencies.
- C. Tell the students how they will be tested.

II. Present the Lesson.

- A. Project the transparency material on the screen as needed.
- B. Use a mask to expose and presnet one point or step at a time.
- C. Use overlays to build on a topic.
- D. Use pencils or pointer to indicate point to be covered.
- E. Use grease pencil or colored transparency pens for marking points or developing points on transparencies.
- *F. Use of silhouetes, miniature models or small objects.

III. Apply the Knowledge.

- A. Students name the parts of an illustration as indicated on a transparency.
- B. Re-show transparencies and questions on points or steps covered.
- *C. Have students, one at a time, discuss and/or arrange pieces on the projector table for identification or proper order.

IV. Verification and/or Evaluation.

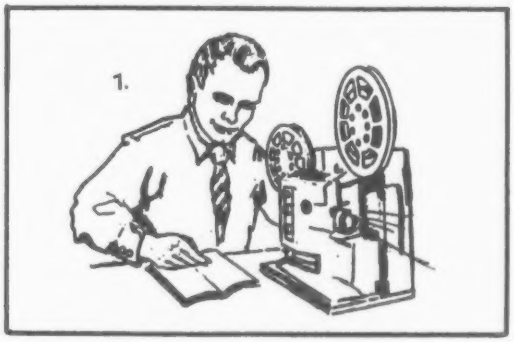
- A. Project test of different types on a screen - to be taken by the students.
- B. Illustrations, or images of objects may be projected for students to label or name parts as indicated.

V. Summarize.

- A. Re-emphasize pertinent steps and key points using the transparency.
- B. For further clarity project teaching points.
- C. Stress and re-emphasize safety factors with the transparency.

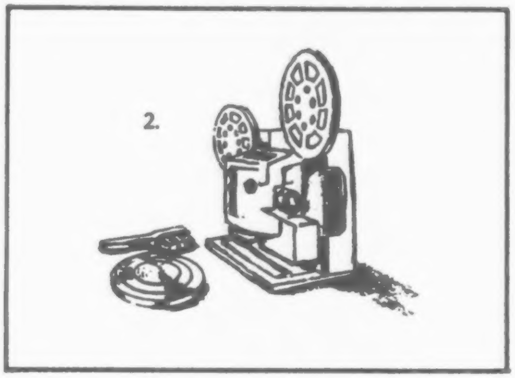
*Silhouettes, miniature models, and small objects (tools, etc.) may be placed on the projector table to project their shape for identification or arrangement in their proper order.

TEN RECOMMENDATIONS FOR FILM USERS



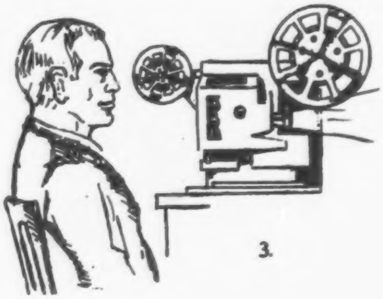
1. Know and understand the projector operation and minor maintenance.

In order to present an effective lesson with film the teacher must be able to operate the projector skillfully. To be efficient the teacher must be able to evaluate the quality of the projected image and sound. This means that the teacher must be able to set up the projector, install the film, focus the projected image, adjust the sound tonal quality and amplification and to say the least, stop and start the machine. The teacher must be prepared when the students arrive. This means: Set up, focus in, warm up, and have the film at the starting point before the class arrives.



2. Projector and film must be clean, free of dirt and lint.

Minor maintenance of the projector includes the removal of dirt and lint. Focus on the screen before threading the projector. In the event any foreign material shows up, open the film gate and clean the picture area with a small soft brush or lint free soft cloth. The professional operator will store one or both of these items in the machine. Nothing can be more distracting or look worse than a dark hairy line in the picture or dirt and lint showing around the edges of the projected picture. Too, a film can be very easily damaged by dirt and lint, and most likely will be if the operator is not careful.

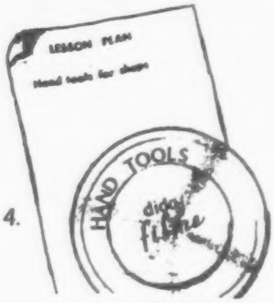


3. Film must be previewed before they are shown.

Often film titles are misleading, with the content completely unrelated to the subject or material that has been implied. The professional teacher previews the film and prepares the lesson around its content. After having previewed a film the teacher should be able to answer certain questions.

Why am I using the film?
How an I using the film?
What can I expect my students to learn from the film?[1]

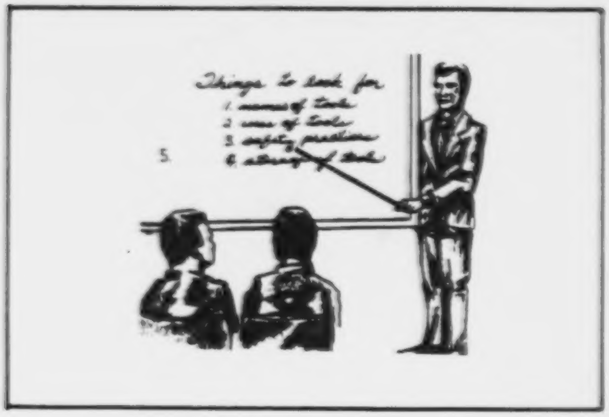
If the previewed film does not meet the teachers criterion it will be necessary to get another film or utilize another aid to help put the lesson across. The teacher must not waste the students' time by showing unrelated film. The primary objective of the teacher is to teach school and not hold school.



4. Relate film and lesson one to the other.

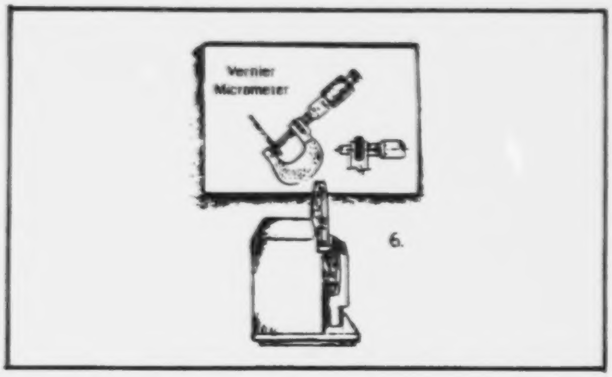
Avoid busy work and extra activities for the student. Each activity must be productive, therefore, show films that are relative to the lesson being taught. Every minute of class time must be used for some worthwhile activity. Films in the classroom are used for teaching purposes and not show time or movie day.

[1] Herron, W.B., Teaching Tools, 1957.



5. Tell the students what to look for in the film.

The film may be utilized in several different ways with the lesson. It may be used as the Presentation, Stage II, of the lesson plan; it may be used to re-enforce the teacher's presentation of Stage II; or it may be used as the summary to emphasize the high points of the lesson. In any event the student must know what to look for in the film, otherwise, students will see what interests them the most. However, keep in mind that the film will not take the place of the teacher. The teacher must be present and must exploit the film to the utmost for it to be effective.



6. Re-show the film if the material proves to be complex, involved, or students have not responded favorably.

Students do not necessarily learn all there is to be learned from one showing of an excellent film. After showing a film ask oral questions and discuss the teaching points. Many times this helps to discover those things that the students have missed. Show the film again. Generally speaking there are few technical films that are of much value if they are shown only once. Teach, give the student an opportunity to try out, and reteach.

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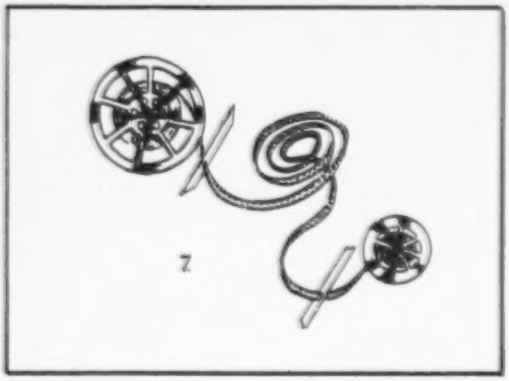
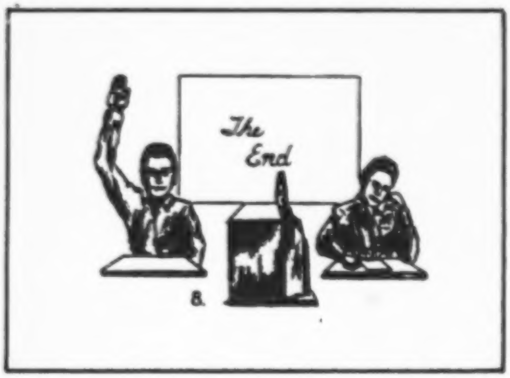


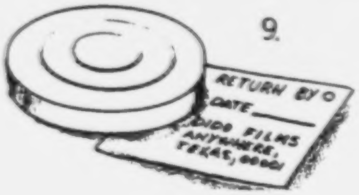
7. Use only that part of the film which proves to be valuable to the lesson.

On occasions film will include material which is of little value to the lesson. This information or material may be found in any part of the film. This is another reason for previewing the film and locating the starting and stopping points. If the unwanted material happens to be in the body of the film mark the reel, silence the sound at this point, and carry on a discussion while this material is silently run through the machine. if this practice is used be sure the students understand that they are studying a lesson so that they will not feel slighted by not having been involved in the entire film.



8. Follow-up the film showing with discussion and testing.

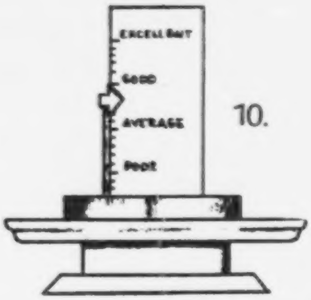
The showing of a film should not be a waste of the teacher's time or student's time and if the student has not learned from the film this is a waste of time. In order to determine whether or not the students have learned from the film the teacher can use two teaching tools; discussion to cause thingking about what took place in the film and allow the students to express themselves. Testing helps to fix the material in students' minds because they know they must organize the material for retelling.



9.

9. Be on time ordering and returning film.

Plan ahead, organize time and dates so that dilm will be available when needed. Well laid plans are easy to follow and helps to make teaching effective. Be prompt to return borrowed or rented film. Other teachers also have plans and teaching that must be carried through. Be courteous and respect the fellow teacher by being prompt and professional.



10.

10. Weigh the merits of a film on its ability to help in the teaching of a productive lesson.

The yard stick for selecting film should not be time, eye appeal or entertainment. Use the five stage lesson plan to present a film and exploit it to the utmost. Good teachers can become more effective teachers with the use of film. No aid will teach for the teacher, therefore, prepare the student, tell the student what to look for in the film, show the film, discuss the film, and test on the film.

STUDENT LEADERSHIP RESPONSIBILITY

SHOP SUPERVISOR DUTIES

1. Supervises other class officers and members.
2. Presides at opening, closing and other class meetings.
3. Rotates clean-up assignments.
4. Makes substitute officer appointments for absentees.
5. Works on assigned jobs except time spent on official duties.
6. Checks facilities for start of class.
7. Rates performance of other officers.
8. Confers with instructor on general welfare.
9. Calls clean-up and dismisses class.

SAFETY SUPERVISOR DUTIES

1. Checks shop and related area for proper light and ventilation.
2. Explains general safety rules and regulations.
3. Checks all machines for safety guards, goggles, and protectors.
4. Administers fire drill and air raid drill.
5. Assists instructor in administering first aid.
6. Makes accident and safety reports.
7. Inspects for proper work dress.
8. Inspects repaired tools and machines before putting them into use.
9. Changes safety posters.
10. Checks for unsafe work habits.
11. Works on regular assigned jobs.
12. Maintains fire fighting equipment.
13. Maintains first aid equipment.
14. Checks shop at close of period for hazards.
15. Makes report at closing session of class.

TOOL ROOM SUPERVISOR DUTIES

1. Issues and receives tools according to plan.
2. Sharpens, repairs, and maintains tools.
3. Mounts and outlines new tools on panels.
4. Improves old tool panels and storage.
5. Inventories all tools and equipment.
6. Makes daily report to shop superintendent on missing tools.
7. Works on regular assigned jobs.
8. Improves tool room.

LIBRARIAN DUTIES

1. Checks in and out all books of shop library.
2. Checks in and out all magazines or other publications of shop library.
3. Collects, stacks, and arranges magazines at close of period on the display shelf.
4. Collects and shelves books at end of period.
5. Checks loan cards for publications due and overdue.
6. Coordinator between shop and school library.
7. Works with the instructor on overdue violations and fees.
8. Catalogues new books and publications.
9. Works on regular assigned jobs.
10. Reports at closing class session on any library irregularities.

STOCK ROOM MANAGER DUTIES

1. Issues material and supplies according to organizational plan.
2. Keeps records of all material and supplies issued.
3. Writes receipt for all funds received for material and supplies.
4. Maintains stock room or stock area in a neat, orderly manner.
5. Confers with instructor on any items that are running low.
6. Works on regular assigned jobs.
7. Keeps running inventory of materials and supplies.
8. Keeps stock room locked when material or supplies are not being used.
9. Reports at closing class session on status of any irregularities or new item of interest to class.

MAINTENANCE SUPERVISOR DUTIES

1. Announces clean-up assignments.
2. Instructs students in specific clean-up duties.
3. Receives reports on tools and machines that need repairs.
4. Inspects and tags tools and machines that need reconditioning or repair.
5. Confers with instructor on plan for getting items reconditioned or repaired.
6. Confers with shop superintendent on substitute clean-up assignments.
7. Oils motors, fans, and machines according to schedule.
8. Works on regular assigned jobs.
9. Inspects student clean-up work and reports during closing session of class.

RECORDING CLERK DUTIES

1. Checks class roll and records absentees.
2. Prepares daily report for principal's office.
3. Checks tardy and absent slips with instructor and records.
4. Furnishes forms for and files reports of other officers.
5. Assists instructor in keeping progress chart up to date.
6. Custodian of job and assignment sheets.
7. Works on regular assigned jobs.
8. Records grades or rating of students by instructor
9. Returns examination or test papers to students.
10. Reports during closing session on status of records and reports.

PUBLIC RELATIONS MANAGER DUTIES

1. Meets and greets all shop visitors.
2. Acts as host on shop tour for visitors.
3. Coordinates exhibit displays or floats.
4. Writes news releases on class activities.
5. Acts as procurement officer for parts and supplies downtown.
6. Assists instructor in arranging special programs and publicity.
7. Answers shop phone or communications.
8. Acts as spokesman for class at school assembly system.
9. Works on regular assigned jobs.
10. Reports at closing session of class on any item of interest to the group.

ACCIDENT LIABILITY OF SHOP TEACHERS

General agreement among authorities on school law is that teachers will likely be considered negligent under the following conditions, should an accident to a pupil occur:

1. Absence of teacher from shop while pupils are in shop.
2. Teacher leaving the shop with unqualified teacher in charge of class.
3. Pupils using equipment in the shop which has not been approved by the board of education. Some teachers bring their personal equipment to the school shop.
4. Permitting pupils to work in the shop other than during the regularly scheduled periods and especially without acceptable supervision.
5. Permitting pupils not enrolled in shop class to use power equipment.
6. Pupils being sent outside the shop to perform hazardous duties.
7. Making the use of all power tools compulsory.
8. Allowing pupils, especially prone to accidents, to use power machines. Some physical and some mental conditions should make a pupil inelgible insofar as the use of some power tools is concerned.
9. Failure to keep written reports of every accident occurring in the school shop regardless of injury.
10. Failure to get written statements from witnesses in case of accident.
11. Failure to administer safety test and to retain such satisfactorily passed tests for use in case of liable suit for negligence.
12. Failure of the teacher to keep in mind the fact that pupils are children and that the actions of children are normally guided by childish impulses.
13. Failure to realize that the case mentioned above is defined by law as greater caution when dealing with children than with adults.
14. Failure to realize that the law demands less care for safety from children than from adults.

NEGLIGENCE consists in the failure to act as a reasonably prudent and careful person would under the circumstances involved. The presence or absence of care demonstrated by a teacher is usually a question for the jury.

THE TEACHER acts in the place of the parent in relation to the pupil. The teacher's duties and rights are equal to, or greater than, those of the parent insofar as negligence is concerned.

--by E. W. Tischendorff, professor of industrial
arts at Kent (Ohio) State University, in May,
1951, Safety Newsletter

SAMPLE

VOCATIONAL INDUSTRIAL EDUCATION DEPARTMENT

STUDENT RECORD CERTIFICATE ON SAFETY INSTRUCTION

Date ____________________

From my personal copy of safety regulations and rules I have carefully read and have had explained to me the general shop rules covering the regulations and rules relative to conduct in the shop; also I have had instruction in the care, adjustment, operation and safety relative to the machines checked on the reverse side.

Student's Name ____________________

School ____________________

This is to certify that ____________________ has passed an examination in the use of the machines checked on the reverse side and is permitted to operate them at his or her own risk.

Students will not be allowed to use the shop machinery unless they possess one of these certificates, duly signed by the ____________________ (Trade) shop instructor and dated.

Negligence on the part of the student to follow rules pertaining to the operation of the machines will result in this certificate being withdrawn.

Instructor ____________________

Figure 57

MACHINES

The individual instructor wil be responsible for listing the appropriate machines here that apply to the particular trade in which instruction is being given.

SAMPLE

STUDENT'S SAFETY STATEMENT FORM

As a further means of protecting the school and also the instructor, the student's safety statement form is recommended. A pattern for the statement is as follows:

> "I have received a copy of the shop safety rules for study and insertion in my notebook. I have read and studied the specific safety rules posted on machines and in the shop."
>
> "I fully understand all the safety rules applicable to this shop. I now feel that I am conversant with sufficient safety instruction to warrant my using shop equipment."
>
> "My knowledge of shop safety is reasonably indicated by the percentage grade on my safety test."

Student's Signature______________________________

Instructor's Signature____________________________

Date____

Figure 58

SAMPLE

PARENTAL PERMIT TO OPERATE MACHINERY AND SAFETY PLEDGE

Period ______________________________ Date ______________________________

______________________________ has my consent to operate the following power machines in the ______________________________ School (Printing) (Mill) (Metal) (Auto Mechanics) (Electricity) Shop, under the supervision of the teacher in charge. Please cross out the name of any machine you do not wish your child to operate.

Mill Shop

Lathe
Shaper
Jig Saw
Jointer
Mortising Machine
Circle Saw
Band Saw
Grinder
Hand Router
Surfacer

Metal Shop

Lathe
Drill Press
Shaper
Grinder
Milling Machine
Welder
Furnace
Forge

(This is just a suggested list of machines.)

____
Parent or Guardian

I hereby promise most sincerely to observe all safety rules set up in this shop. Furthermore, I will try to protect others from hazard and accidents and if necessary call the attention of the instructor to any violation of the safety rules.

____
Student's Signature

Figure 59

SAMPLE

SAFETY IN RELATION TO PERFORMANCE (GRADING %)

PERFORMANCE TEST SCORE SHEET

Name of Test	Maximum Credit	Credit Allowed
Economical use of material	10	
Good use of hand tools	10	
Good use of machine tools	15	
Systematic procedure	15	
Accuracy to given dimensions of finished job	20	
General appearance of finished job	20	
Clean-up and shop safety	10	

Total Mark__________

____
Name of Student

Figure 60

SAMPLE

SAFETY SUPERVISOR'S CHECK SHEET

Shop________________________________Room Number________________

Supervisor's Name ______________________Date______________________

(NOTE: This form is to be filled out each day.)

Duties	Mon.	Tue.	Wed.	Thur.	Fri.
1. Are aprons proper?					
2. Grinder tool rest in proper position.					
3. Goggles accessible to pupils.					
4. Hammers free from burrs.					
5. Paint cabinet.					
6. Shop cleanliness.					
7. First aid.					
8. Stock room in order.					
9. Guards in place.					
10. Report "horseplay" to instructor.					
11. Report dangerous work habits.					
12. Watch for improper use of tools.					
13. Report all accidents to instructor.					
14. Check all switches and gas valves at close of period.					

Figure 61

SAMPLE

SHOP INSPECTION REPORT

School________________________Date________________________

Teacher's Name__________________Type of Shop__________________

1. Is there an approved rag can with snap cover?____________________
2. Condition of paint cabinet? Poor____Fair____Good____Excellent_____.
3. Condition of shop in respect to cleaniness? Poor____Fair____Good_____ Excellent_____.
4. Are all machines well guarded?______________________________
5. Are guards found in proper position?__________________________
6. Are students using goggles while grinding?______________________
7. Are grinder tool rests in postion?_____________________________
8. Are students allowed to work around revolving machinery without removing loose clothing?______________________________________
9. Are sleeves rolled up whole working on revolving machinery?__________
10. Is there evidence of students wearing loose neckties around revolving machinery?____
11. Does the teacher wear appropriate work clothing?__________________
12. What is the condition of tools? Poor____Fair____Good____Excellent____.
13. Is the stock rack kept in order?______________________________
14. Are there any signs of abuse of machines and tools?________________
15. Are there any oily rags left lying around the shop?________________
16. What is the condition of the bench drawers?_____________________
17. Are lines painted on floor around machines and aisles?______________

____
Building Inspector

____
Supervisor of Industrial Education

Figure 62

SAMPLE

STUDENT'S PRIVATE PHYSICIAN CARD

FRONT

Student's Last Name	First Name	Middle Name
Home Address		
Parent's Home Phone	Parent's Office Phone	
Physician's Name	Physician's Address	
Physician's Home Phone	Physician's Office Phone	
Parent's Signature	Date	
School		
Student's Private Physician Card		(over)

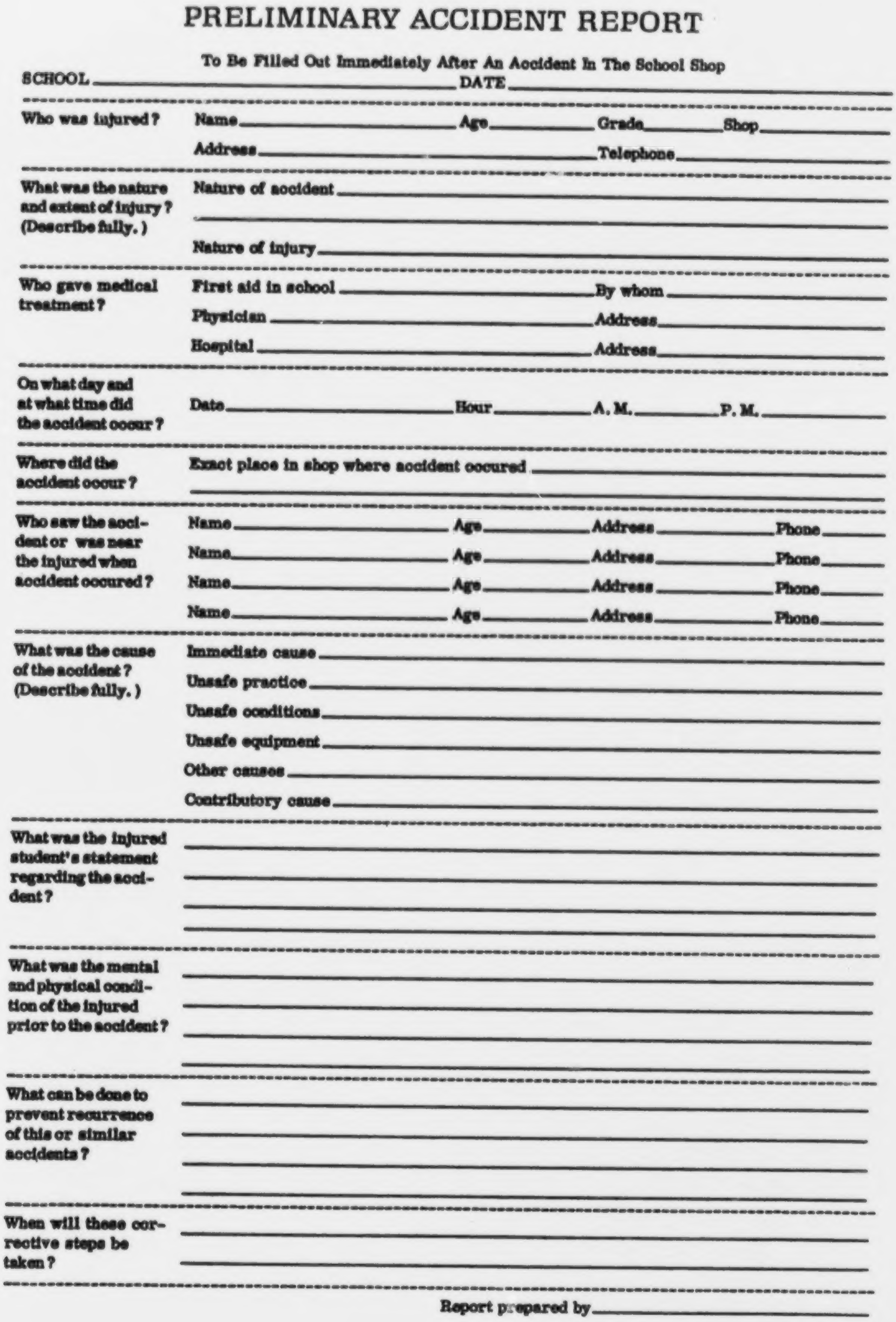
REVERSE

Date

In the case of accident or serious illness, if the school is unable to contact me, I hereby authorize the school to take my child to the physician indicated on the reverse side of this card. If it is impossible to contact this physician, the school may take my child to a hospital authorized by the Board of Health.

Parent's Signature

Figure 63



PRELIMINARY ACCIDENT REPORT

To Be Filled Out Immediately After An Accident In The School Shop

SCHOOL ____________ DATE ____________

Who was injured?	Name ________ Age ________ Grade ________ Shop ________ Address ________ Telephone ________
What was the nature and extent of injury? (Describe fully.)	Nature of accident ________ Nature of injury ________
Who gave medical treatment?	First aid in school ________ By whom ________ Physician ________ Address ________ Hospital ________ Address ________
On what day and at what time did the accident occur?	Date ________ Hour ________ A. M. ________ P. M. ________
Where did the accident occur?	Exact place in shop where accident occured ________
Who saw the accident or was near the injured when accident occured?	Name ________ Age ________ Address ________ Phone ________ Name ________ Age ________ Address ________ Phone ________ Name ________ Age ________ Address ________ Phone ________ Name ________ Age ________ Address ________ Phone ________
What was the cause of the accident? (Describe fully.)	Immediate cause ________ Unsafe practice ________ Unsafe conditions ________ Unsafe equipment ________ Other causes ________ Contributory cause ________
What was the injured student's statement regarding the accident?	________
What was the mental and physical condition of the injured prior to the accident?	________
What can be done to prevent recurrence of this or similar accidents?	________
When will these corrective steps be taken?	________

Report prepared by ____________

Figure 64

SAMPLE

ACCIDENT REPORT

1. Name of School__________________Location____________________________
2. Name of Pupil___________________Birth_____________________Grade_____
3. Address________________________Phone_______________________________
4. Parent or Guardian____
5. Date of Accident________________Time of Accident_____________________
6. Character of Injury (Be Specific)_____________________________________

   ____
7. Teacher's Complete Statement of How the Accident Happened_______________

   ____

   ____
8. If Accident Occurred on a Machine, Were Guards in Place?________________
9. Names of Two Eyewitnesses to Accident:

   ____
   (Name) (Address)

   ____
   (Name) (Address)
10. Who rendered first aid?_________________Position______________________
11. Was the injured pupil sent (a) back to class?____(b) home?____
    (c) private physician?____(d) hospital?____
12. Name and address of doctor or hospital that gave treatment AT PARENT'S EXPENSE:____

    ____

Signature_____________________________Signature______________________________
Instructor Principal

Figure 65

INSTRUCTOR'S CHECK SHEET

A GOOD SHOP TEACHER

NOTE: The teacher may wish to use a check sheet for self evaluation. By checking each item carefully and correcting weaknesses as they are discovered, the shop teacher can improve the quality of instruction.

I. Teaching Shop Work

   A. Are manipulative lesson plans on hand and being used?

   B. Are the demonstrations with the lesson plans effective?

   C. Is the job being demonstrated and taught as it is done in industry?

   D. Is a complete set of job and task sheets on hand for each job and for each student?

   E. Are the students able to work successfully from the job and task sheets?

   F. Are productive jobs available for the students to develop skills?

   G. Is each student's work checked systematically?

   H. Is accuracy of performance required of each student?

   I. Is the teacher's time distributed among students on the basis of individual needs?

   J. Are safety rules enforced?

   K. Are good safety and work habits exhibited by the instructor?

   L. Does the student have adequate practice on the job?

   M. Are the students given an opportunity to perform on their own?

II. Teaching Related Information

   A. Are information lesson plans on hand and being used?

   B. Is the information lesson being used effectively?

   C. Is the information lesson flexible in order to fit the needs of the individuals in the class and the available class time?

   D. Are assignment and information sheets available for each lesson and each student?

   E. Is the assignment sheet more than an exercise sheet?

   F. Are the students using the instructional material successfully?

G. Is the Information being taught must and should know?

H. Is the class time being utilized as teaching time?

I. Are individual needs being taken care of?

J. Are methods of presentation being varied and student interest maintained?

K. Are students given an opportunity to drill on the lesson?

L. Are students given an opportunity to participate in the lesson presentation?

M. Are teaching aids being utilized to best advantage with each lesson?

N. Is an adequate testing program being carried out?

O. Is a considerate understanding manner being used by the teacher?

P. Are students required to keep a note book?

Q. Is pertinent reading material selected, and are interesting assignments made?

III. Discipline

A. Are students wide awake and interested?

B. Is every student working and working willingly?

C. Are the students comfortably seated or situated in the work station?

D. Is the room or shop adequately lighted, ventilated and a comfortable temperature maintained?

E. Is the floor clear of all litter?

F. Is the furniture clean and unmarked?

G. Is there an existing published plan of management for rotating students through work stations, leadership duties, and cleanup duties?

H. Is there an existing published plan of organization for machines, equipment, tools, supplies, and the physical plant?

I. Is there prompt and tactful handling of disciplinary problems?

J. Is there a published set of rules and regulations?

K. Have each of the students been furnished with a personal copy of the rules and regulations?

L. Have the rules and regulations been read and explained to the students?

M. Are the rules and regulations wisely and fairly enforced?

IV. Housekeeping

A. Is the furniture and equipment arranged in a uniform and useable manner?

B. Are pictures, charts, diagrams, and VICA pledge and creed arranged neatly on the walls?

C. Are the window shades or blinds in good repair and hung properly at the windows?

D. Are coats, hats, and bundles placed neatly in the proper storage area?

E. Is the chalkboard work neat and instructive?

F. Is the teacher's desk clean, neat, and clear of litter?

G. Is the teaching aid and supply storage clean and neat?

H. Is the bulletin board neat and orderly with current displays?

I. Are cabinets and lockers in good repair and interiors neat and orderly?

J. Is the stock room clean and in good order?

K. Is the shop clean and orderly after the last class of the day?

L. Is the classroom in order and clean at all times?

M. Is the reference library in a clean and neat order?

V. Reports and Records

A. Are progress charts filled out up-to-date for each student?

B. Is there an individual record for each student with attendance and grades posted?

C. Are records so arranged that information may be obtained without loss of time and energy?

D. Are reports prepared accurately, legibly and on time?

E. Is the inventory complete, accurate and up-to-date?

F. Are requests for materials, tools, machines and equipment complete, including exact specifications?

G. Is the budget complete and in on time?

VI. Guidance and Counseling

A. Are noteworthy results in guiding students vocationally recorded?

B. Are students interviewed and counseled concerning the selection of an occupation?

C. Are students advised on trade standards, physical standards, and working conditions?

D. Is there an adequate program of follow-up on graduates?

E. Is there an adequate recruiting plan to attract students into the course?

F. Is there willing cooperation with the school counselors?

G. Is time and effort exerted in "selling" the program to the general education faculty members?

VII. Cooperation and Executive Ability

A. Is a pleasant and friendly disposition exhibited when dealing with other teachers and administrators?

B. Are any special services being rendered to the school as a whole?

C. Are required reports submitted punctually?

D. Are constructive suggestions submitted or offered?

E. Are constructive ideas exchanged with other teachers, industrial employers and employees, and students?

F. Is responsibility for extracurricular activities shared willingly with other teachers?

G. Are the presentations and work with students, teachers and administrators well accepted?

VIII. Attendance and Punctuality of Students

A. Is the work interesting and productive enough to draw students to the class regularly?

B. Is the work interesting and productive enough to induce students to be punctual?

C. Is the classroom and shop always open and prepared for the day at least 15 minutes before class time?

D. Are the students greeted as they arrive for the class?

IX. Self-Improvement

A. Is constructive criticism willingly accepted from administrators and beneficial results derived from the criticism?

B. Is reading and studying done systematically?

C. Is there a plan for summer school or other professional improvement?

D. Are professional meetings attended regularly?

E. Is the teacher a member of important teacher associations?

F. Is an active part taken in the professional teacher associations?

G. Is the teacher up-to-date on the occupation being taught?

H. Are other schools and industrial shops visited?

I. Are trade journals read regularly?

A BILL
TO BE ENTITLED

AN ACT to require teachers and pupils in Texas public schools to wear protective eye devices when participating in certain vocational, industrial arts, and chemical-physical course or laboratories; and declaring an emergency.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF TEXAS.

Section 1. Industrial quality eye protective devices shall be worn by every teacher and pupil in Texas participating in any of the following courses:

(1) Vocational or industrial arts shops or laboratories involving experience with
  (A) hot molten metals;
  (B) milling, sawing, turning, shaping, cutting or stamping of any solid materials;
  (C) heat treatment, tempering, or kiln firing of any metal or other materials;
  (D) gas or electric arc welding;
  (E) caustic or explosive materials;

(2) Chemicals or combined chemical-physical laboratories involving caustic or explosive chemicals or hot liquids or solids.

Sec. 2. In this Act, "industrial quality eye protective devices" means devices meeting the standards met by the State Department of Health.

Sec. 3. The governing boards and administrators of Texas school districts offering any of the listed courses are responsible for furnishing free of charge or providing at cost to teachers and pupils participating in the course the required eye protective devices.

Sec. 4. The importance of this legislation and the crowded condition of the calendar in both Houses create an emergency and an imperative public necessity that the Constitutional Rule requiring bills to be read on three several days in each House be suspended, and the Rule is hereby suspended; and that this Act take effect and be in force from and after its passage, and it is so enacted.

NOTE: This bill signed into law on April 2, 1965 by Governor John Connally and to go into effect in ninety days.

INDUSTRIAL HYGIENE

Standards for
Eye Protection
in Public Schools

Occupational Health Regulation No. 5

TEXAS STATE DEPARTMENT of HEALTH
Division of Occupational Health
and Radiation Control

OH 35 June 1965

STANDARDS FOR FACE AND EYE PROTECTIVE DEVICES IN PUBLIC SCHOOLS were adopted by the Texas State Board of Health on June 14, 1965. Basis for these standards was obtained from American Standards Association Code Z2.1 - 1959. These actions are in accordance with the authority granted in Article 4418(d) of The Revised Civil Statutes, State of Texas, and are promulgated in accordance with Article 4477, Section 19(b).

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TABLE OF CONTENTS

1. Purpose and Scope 1
    1.1 Purpose 1
    1.2 Scope 1

2. Exceptions 1

3. Definitions 1
    3.1 General Information 1
    3.2 Specific Definitions 1

4. General Requirements 3

5. Eye Protectors 4
    5.1 Face Shields 4
    5.2 Helmets and Hand Shields 5
    5.3 Goggles, Eyecup 5
    5.4 Spectacles, Metal or Plastic Frame 6
    5.5 Goggles, Flexible Fitting 6
    5.6 Goggles, Plastic Eyeshield 7
    5.7 Spectacles, Plastic Eyeshield 7
    5.8 Goggles, Foundrymen's 8

6. Materials and Methods of Test of Protectors . . . 9
    6.1 Materials 9
    6.2 Disinfection 9
    6.3 Corrosion Resistance 9
    6.4 Water Absorption 10
    6.5 Flammability 10
    6.6 Impact 10

Tables
    Table 1, Selection of Eye and Face Protective Devices 12

Appendix for Section 6 13
    A1 Water Absorption Test 13
    A2 Selection of Shade Numbers for Welding Filters 15
    A3 Maintenance and Disinfection of Eye Protectors 16
    A4 Fitting of Goggles and Spectacles 17

"STANDARDS FOR FACE AND EYE PROTECTIVE DEVICES IN PUBLIC SCHOOLS"

1. PURPOSE AND SCOPE

1.1 Purpose. The purpose of this standard is to provide governing boards and administrators of Texas school districts reasonable and adequate means, ways and methods for the proper selection and safe use of eye protective equipment.

1.2 Scope. This standard shall apply to all teachers and pupils within Texas public schools participating in certain vocational, industrial arts, and chemical-physical courses or laboratories where potentially hazardous operations exist. These standards were extracted from American Standards Association Bulletin Z2.1 - 1959, which is to be used as a further reference for materials not contained with said standards.

2. EXCEPTIONS

Variations from the requirements of this standard may be granted by the Texas State Department of Health only when it is demonstrated to the satisfaction of said agency that equivalent protection is afforded. For protection of personnel involved with operations not listed therein, please consult the Division of Occupational Health and Radiation Control, Texas State Department of Health.

3. DEFINITIONS

3.1 General Information.

3.1.1 The word "approved" refers to approval by the Texas State Department of Health, i.e., the agency having jurisdiction over the specific requirement.

3.1.2 In this standard, the use of the word "shall" indicates a mandatory requirement. The word "should" indicates a recommendation.

3.2 Specific Definitions.

Bridge Size: The Distance between lens on the nose side of each eye, expressed in millimeters.

Contaminant: A harmful material that is foreign to the normal atmosphere.

Cover Plate: A removable pane of colorless glass, plastic-coated glass, or plastic that covers the filter plate and protects it from damage.

Dust: Finely divided solid particles generated by processing (including handling, crushing, grinding, or pulverizing) materials such as rock, metal, wood, and grain.

Eyepiece: A gastight transparent window in a gas-mask facepiece through which the wearer may see.

Eye Size: A measurement expressed in millimeters and denoting the size of the lens-holding section of an eye frame.

Face Shield:	A device worn in front of the eyes and a portion or all of the face, whose predominant function is protection of the eyes and face.
Filter Plate:	Removable pane in the window that absorbs varying proportions of the ultraviolent, visible, and infrared rays according to the composition and density of the plate.
Fume:	Solid dispersoids formed by condensation of vapors, such as those from heated metals.
Goggles:	A device, usually held in the hand or supported on the wearer's chest, designed to protect the eyes and face during welding operations.
Helmet:	A device that is worn by a person to shield the eyes, face, neck and other parts of the head.
Lens:	The transparent glass or plastic device through which the wearer of the protective goggles or spectacles sees, and which provides protection to the eyes against flying objects, glare, or injurious radiation, or a combination of these hazards.
Lens, Corrective:	A lens ground to the wearer's individual corrective prescription.
Mist:	Suspended liquid droplets generated by breaking up a liquid into a dispersed state.
Particulate Matter:	Matter occurring in the form of minute separate particles, such as dust, fumes, mist, and fog; a disperoid.
Protector:	A device that provides head, face and eye protection against the hazards of processes encountered in employment or in the natural environment.
Shield:	A device to be held in the hand, or supported without the aid of the operator, whose predominant function is protection of the eyes and face.
Spectacle:	A device patterned after conventional-type spectacle eyewear but of more substantial construction, either with or without side shields, and with clear, impact-resistant filter or corrective lenses of glass or plastic.

4. GENERAL REQUIREMENTS

4.1 Eye protection shall be required where there is reasonable probability of injury to the body that can be prevented by such protection.

4.2 In such cases, governing boards and administrators of Texas school districts shall furnish protectors of a type suitable for the work to be performed, and participating teachers and pupils shall use such protectors.

4.3 No person shall be subjected, without permission, to a hazardous environment condition.

4.4 Protectors shall meet the following minimum requirements:

(1) They shall provide adequate protection against the particular hazards for which they are designed.

(2) They shall be reasonably comfortable when worn under the designated conditions.

(3) They shall fit snugly and shall not unduly interfere with the movement of the wearer.

(4) They shall be durable.

(5) They shall be capable of being disinfected.

(6) They shall be easily cleanable.

4.5 Protectors should be kept clean and in good repair.

4.6 Eye protectors shall be provided where machines or operations present the hazard of flying particles, pieces, or substances.

4.7 Workers whose vision requires the use of corrective lenses in spectacles and who are required by this standard to wear protective goggles shall be provided with goggles of one of the following types:

(1) Goggles whose protective lenses provide optical correction, or

(2) Goggles that can be worn over corrective spectacles without disturbing the adjustment of the spectacles, or

(3) Goggles that incorporate corrective lenses mounted behind the protective lenses.

4.8 Only protectors which bear the label of or meet the standards set forth in American Standards Association Bulletin Z2.1 - 1959 shall be used.

5. EYE PROTECTORS

5.1 FACE SHIELDS

5.1.1 Function. The devices described in this section are designed to provide protection to the face (i.e., the front part of the head including forehead, eyes, cheeks, nose, mouth, chin) and neck, where required, from flying particles and sprays of hazardous liquids and, in addition provide antiglare protection where required.

5.1.2 Intended Uses. Some typical uses for face shields include the following: (1) woodworking operations where chips and particles fly; (2) metal machining causing flying particles; (3) buffing, polishing, wire brushing, and grinding operations where flying particles or objects may strike the face; (4) spot welding; (5) handling hot or corrosive materials.

5.2 HELMETS AND HAND SHIELDS

5.2.1 Function. The devices described in this section are designed to provide protection for the eyes, face, ears, neck against intense radiant energy. Typical operations which require helmets or hand shields include various kinds of arc welding and heavy gas cutting.

5.2.2 Styles. The helmet and the hand shield are made to the same basic design and of the same basic materials--a bowl-shaped or modified bowl-shaped device containing a window with filter plate which allows the wearer to see the radiant object, yet prevents harmful intensities of radiation from reaching his eyes. The helmet headgear has an adjustable frame by which it is supported on the head; while the hand shield has a handle attached to the bottom by which it is held in the hand. The basic designs may be modified to provide protection against special hazards, but modified equipment shall meet the same requirements as the basic design.

5.3 GOGGLES, EYECUP

5.3.1 Models. The two basic types of eyecup goggles shall be subdivided into the following classes:

Chippers' Models providing protection against flying objects. Eyecups shall be ventilated in a manner to permit circulation of air. Ventilation openings shall be such as to exclude a spherical particle of 0.04 inch in diameter.

Dust and Splash Models providing protection against relatively fine dust particles or liquid splashes. Eyecups shall be ventilated in a manner to permit circulation of air. The ventilation openings shall be baffled or screened to prevent the direct passage of dust or liquids into the interior of the eyecups.

Welders' and Cutters' Models providing protection against glare and injurious radiations. The basic designs may be modified to provide more protection against special hazards, but the modified equipment shall meet the same requirements as the basic design. Eyecups shall be ventilated in a manner to permit circulation of air. The ventilation openings shall be baffled to prevent the passage of light rays into the interior of the eyecups.

5.4 SPECTACLES, METAL OR PLASTIC FRAME

5.4.1 Protection. Spectacles shall provide protection to the eye from flying objects and, where required, from glare and injurious radiations. Spectacles without side shields are intended to provide frontal eye protection only. Where side as well as frontal eye protection is required, the spectacles shall be provided with side shields. The edge of the side shield shall have a smooth finish or shall be padded.

5.4.2 Materials and Methods of Test.

5.4.2.1 General materials used shall be capable of withstanding the disinfection, corrosion resistance, water absorption, and inflammability test outlined in Section 6.

5.5 GOGGLES, FLEXIBLE FITTING

5.5.1 Description. Goggles shall consist of a frame (composed of a flexible, chemical-resistant, nontoxic, nonirritating, ans slow-burning material, forming a lens holder), lenses, and a positive means of support on the face such as an adjustable headband of suitable material to retain the frame comfortably and snugly in place in front of the eyes. The lens holder shall be such that the lenses are held firmly and tightly and may be removed or replaced without the use of tools. The goggles may be ventilated or not, as required by their intended use. Where chemical goggles are ventilated, the openings shall be such as to render the goggles splash-proof.

5.5.2 Protection. Goggles shall provide eye protection from fine dusts, fumes, liquids, splashes, mists, and spray.

5.5.3 Application. Specific application for use of flexible fitting goggles will be found in Table 1.

5.5.4 Materials and Methods of Test. Plastic lenses used in flexible fitting goggles shall be not less than 0.050 inch in thickness. Materials used shall be capable of withstanding the disinfection, corrosion resistance, water absorption, and flammability test outlined in Section 6.

5.6 GOGGLES, PLASTIC EYESHIELD

5.6.1 Description. The goggles shall consist of a frame of plastic material, lens or lenses, and means of support such as an adjustable headband to retain the goggles in front of the eyes. The frame and lens need not be of the same material. The lens need not be an integral part of the goggles. The frame may be translucent, clear, or opaque, and may be ventilated or not, as required by its intended use. The edge of the frame which bears against the face shall have smooth surface free from roughness or irregularities which might cause discomfort to the wearer.

5.6.2 Protection. The goggles shall provide protection against flying objects and, where required, against glare and injurious radiations. Where the goggles are used for protection against injurious light radiation, the lenses and frames shall meet the requirements of Appendix A2 and the frames shall prevent the passage of injurious light rays.

5.6.3 Application. Specific application for use of plastic eyeshield goggles will be found in Table 1.

5.6.4 Materials and Methods of Test. Where plastic lenses are used in plastic eyeshield goggles, they shall be not less than 0.050 inch in thickness. If glass lenses are used, they shall be not less than 3.0 millimeters nor more than 3.8 millimeters in thickness. Materials used shall be capable of withstanding the disinfection, corrosion, resistance, water absorption, and flammability test outlined in Section 6.

5.7 SPECTACLES, PLASTIC EYESHIELD

5.7.1 Description. Spectacles shall consist of a frame of metal, fiber, or plastic lens or lenses, and temples or other suitable means of support to retain the frame before the eyes. The lens or lenses need not be an integral part of the frame. The spectacles shall have side shields, if required by their intended use.

5.7.2 Protection. Spectacles shall provide protection to the eye from flying objects and, where required, from glare and injurious radiation. Spectacles without side shields provide frontal eye protection only. Where side as well as frontal eye protection is required, the spectacles shall be provided with side shields.

5.7.3 Application. Specific application for use of plastic eyeshield spectacles will be found in Table 1.

5.7.4 Materials and Methods of Test. Plastic lenses used in plastic eyeshield spectacles shall be not less than 0.050 inch in thickness. Materials used shall be capable of meeting the applicable requirements and withstanding the test outlined in Section 6.

5.8 GOGGLES, FOUNDRYMEN'S

5.8.1 Description. Goggles shall consist of a mask made of a flexible, nonirritating, noncombustible or slow-burning material, such as leather or flexible plastic, metal lens holders attached thereto, lenses, and a positive means of support of the face, such as an adjustable headband, to retain the mask comfortably and snugly in place in front of the eyes. The edge of the mask in contact with the face shall be provided with a binding of corduroy or other suitable material. The lens holders shall be so designed that the lenses are held firmly and tightly and may be readily removed or replaced. The lens holders shall be ventilated to permit circulation of air. Ventilation openings shall exclude a spherical particle 0.04 inch in diameter. For protection against heavy concertrations of dust, the use of a finemesh screen lining (e.g., 100-mesh screen) is recommended. Such lining shall be suitable and permanently fastened to the inside surface of each lens holder assembly.

5.8.2 Protection. The foundryman's goggles shall provide protection against impact and hot-metal splash hazards encountered in foundry operations such as melting, pouring, chipping, babbitting, grinding, and riveting. There required, they shall also provide protection against dusts.

5.8.3 Application. Specific application for use of foundrymen's goggles will be found in Table 1.

5.8.4 Materials and Methods of Test. Materials use shall be capable of withstanding the disinfection, corrosion-resistance, water-absorption, and flammability test outlined in Section 6.

6. MATERIALS AND METHODS OF TEST OF PROTECTORS

6.1 Materials. Materials used in the manufacture of eye protectors shall combine mechanical strength and lightness of weight to a high degree, shall be nonirritating to the skin when subjected to perspiration, and shall withstand frequent disinfection by the methods hereinafter prescribed. Where metals are used, they shall be inherently corrosion resistant.

6.2 Disinfection. All materials shall be such as to withstand, without visible deterioration or discoloration, washing in detergents and warm water, rinsing to remove all traces of detergent, and disinfection by the following methods.

(1) Immersion for 10 minutes in a solution of formalin made by placing one part of 40 percent formaldehide solution in 9 parts of water at a room temperature of 68°F.

(2) Subjection to a moist atmosphere of formaldehide for a period of 10 minutes at a room temperature of 68°F.

(3) Immersion for 10 minutes in a solution of modified phenolics, hypochlorite, or quaternary ammonium compounds in strength specified by the manufacturer at a room temperature of 68°F.

6.3 Corrosion Resistance. Metal parts shall be tested for corrosion resistance by placing them in a boiling aqueous 10-percent (by weight) solution of sodium chloride for a period of 15 minutes. The parts upon being removed from this solution shall be immediately immersed in a 10-percent (by weight) aqueous solution of sodium chloride at a room temperature of 68°F. They shall then be removed from this solution and, without wiping off the adhering liquid allowed to dry for 24 hours at room temperature. The metal parts shall then be rinsed in lukewarm water and allowed to dry. On visual inspection, the metal parts shall show no signs of roughening of the surface resulting from corrosion.

6.4 Water Absorption. Plastic parts shall be tested for water absorption and the results calculated in accordance with Test Method No. 7031 of Federal Specification L-P-406 (see Appendix A1). The amount of water absorbed shall not exceed 5 percent.

6.5 Flammability

6.5.1 Eyecup Goggles. Eyecup goggles shall be tested for flammability by use of a 5/8" high diameter Bunsen burner, adjusted for a 3/4" high nonluminous flame of commercial natural gas (1,000 - 1,200 British thermal units). The temple side of the specimen shall be held at the time of this flame in a draft-free room and the time (in seconds) required to ignite the material so the it will remain burning after the flame is removed shall be determined. The time required to ignite the specimen in the manner described shall be not less than 4 seconds.

6.5.2 All other types. Where plastic materials are used, such materials shall be slow burning. Cellulose nitrate, or materials having flammability characteristics approximating those of cellulose nitrate, shall not be used. Flammability of the materials shall be no greater than that exhibited by cellulose acetate or acetate butyrate.

6.6 Impact

6.6.1 Test for Lenses of All Types. The frame with lens shall be supported on a wooden block of such size and shape as to fit the frame securely but not to touch the lens. a 7/8 inch diameter steel ball, weighing approximately 1.56 ounces, shall be freely dopped from a height of 50 inches onto the horizontal upper surface of the lens. The edge of the lens shall not chip from the shock nor shall the lens be displaced from the frame.

6.6.2 Lens on Block. The lens shall be removed from the frame and placed horizontally on the end of a hardwood tube having an upper periphery conforming in shape and size to the lens to be tested and a wall thickness not greater than 3/16 inch. A washer of rubber packing not more than 1/8 inch thick and of the same shape and size as the end of the tube shall be place between the lens and the tube. Thr rubber washer shall be of the quality required for a grade A gasket in Federal Specification HH-G-156. The 7/8 inch steel ball shall be freely dropped from a height of 50 inches onto the horizontal outer surfaces of the lens. The lens shall not fracture from the impact of the steel ball.

6.6.3 Breakage Pattern. As a test to determine the type of breakage pattern exhibited by a lens when subjected to a force sufficient to break it, a lens may be broken by increasing the height of drop of the 7/8 inch steel ball or by employing a heavier ball. If made of glass, the lens shall break predominately with radial cracks with a minor tendency toward concentric cracks. Any tendency to break with lines of cleavage parallel to the surface indicates an unsatisfactory heat treatment; and the lenses represented by that sample shall be considered as not conforming to these requirements.

TABLE 1

Selection of Eye- and Face-Protective Devices

		Permissible Protective Devices	
Hazard Involved	Part to be Protected	Type	Reference
Relatively large flying objects	Eyes, Face	Goggles	5.3, 5.6, 5.8
		Spectacles	5.4, 5.7
		Face Shields	5.1
Dust and small flying particles	Eyes, Face	Goggles	5.3, 5.6, 5.8
		Spectacles	5.4, 5.7
		Face Shields	5.1
Dust and wind	Eyes	Goggles	5.3, 5.6
		Spectacles	5.4, 5.7
Molten metal	Eyes, Face	Goggles	5.3, 5.6, 5.8
		Spectacles	5.4, 5.7
		Face Shields	5.1
Gases, fumes and smoke	Eyes, Face	Goggles	5.5, 5.6
Liquids	Eyes, Face	Goggles	5.5, 5.6
		Face Shields	5.1
Reflected light	Eyes	Goggles	5.6
		Spectacles	5.4, 5.7
Injurious radiant energy (moderate)	Eyes	Goggles	5.3
		Helmets	All described in 5.2
		Hand Shields	All described in 5.2
		Face Shields	(must include crown protector and chin protector) 5.1
Injurious radiant energy (intense)	Eyes, Face	Helmets	All with spectacles described in 5.4
		Hand Shields	All with spectacles described in 5.4

APPENDIX FOR SECTION 6

A1. WATER ABSORPTION TEST (FOR WEIGHT AND DIMENSIONAL CHANGES)

A1.1 Specimens

A1.1.1 Molding Compounds. Test specimens for molding compounds shall be disks 2 inches in diameter by 0.125 ± 0.007 inch thick.

A1.1.2 Sheets. Test specimen of laminated compounds and specimens cut from material shall be 1 by 3 inches by the thickness of the sheet.

A1.1.3 Rods. The test specimen for rods shall be 1 inch in length for rods 1 inch in diameter or under and 1/2 inch in length for larger diameter rods. The diameter of the specimen shall be the diameter of the finished rod.

A1.1.4 Tubes. The test specimen for tubes less than 3 inches in inside diameter shall be the full section of the tube and 1 inch in length. For tubes 3 inches in length in the circumferential direction of the tube and 1 inch in width length-wise of the tube.

A1.1.5 Finish. The tube specimens for sheets, rods, and tubes shall be machined, sawed, or sheared from the sample so as to have smoother edges free from cracks. The cut edges shall be made smooth by finishing with No. 000 or finer sandpaper or emery cloth. Sawing, machining, and finishing operations shall be slow enough to that the material is not heated appreciably.

A1.2 Apparatus

(1) Circulating air over maintained at 122° ± 4°F (50° ± C)

(2) A desiccator

(3) Analytical balance

(4) Micrometer, gage, or caliper capable of measuring accurately to 0.001 inch

A1.3 Procedure

A1.3.1 Three specimens of the sample to be tested shall be conditioned in an oven at 122° ± 4°F (50° ± 2°C) for 24 hours. After conditioning, the specimens shall be cooled in a desiccator and weighed. Dimensions of the specimens shall be measured with a micrometer gage to 0.001 inch. The specimens shall then be completely immersed in distilled water maintained at a temperature of 77° ± 4°F (25° ± 2°C). At least 50 milliliters of distilled water shall be employed for immersing each specimen. At the end of 24 hours immersion, each specimen shall be removed, the surface moisture quickly absorbed by a dry cloth, and the specimen reweighed. If the specimen is 1/16 inch or less in thickness, it shall be put in a weighing bottle immediately after removing the surface moisture and shall be weighed in the bottle. The dimensions shall then be remeasured.

A1.3.2 When materials are known or suspected to contain any appreciable amount of water-soluble ingredients, the specimens after immersion, weighing, and measuring shall be reconditioned for the same time and temperature as used in the original drying period. They shall then be cooled in a desiccator and immediately reweighed. If the reconditioned dry weight is lower than the conditioned dry weight found after the original drying before immersion, the difference shall be considered as water-soluble matter lost during the immersion test. For such materials, the water absorption value shall be taken as the sum of the increase in weight upon immersion and of the weight of the water-soluble matter.

A1.4 Report. The report shall include the data specified under Section 1, paragraph 8 of Specification L-P-406 and the following:

(1) The percentage increase in weight during immersion calculated to nearest 0.01 percent as follows:

Increase in weight, percent=

$$\frac{\text{Wet Weight} - \text{Conditioned Weight}}{\text{Conditioned Weight}} \times 100$$

(2) The percentage of soluble matter lost during immersion, if determined, calculated to nearest 0.01 percent as follows:

Soluble matter lost, percent=

$$\frac{\text{Conditioned Weight} - \text{Reconditioned Weight}}{\text{Conditioned Weight}} \times 100$$

When the weight on reconditioning the specimen after immersion in water exceeds the conditioned weight prior to immersion, report "not loss of soluble matter."

(3) The percentage of water absorbed in 24 hours, which is the sum of the values in items (1) and (2).

(4) The percentage change in each dimension during immersion.

(5) Observations regarding any change in physical condition of the specimen.

A2. SELECTION OF SHADE NUMBERS FOR WELDING FILTERS

The following is a guide for the selection of the proper shade numbers of filterlenses or windows used in welding. These recommendations may by varied to suit the individual's needs.

Welding Operations	SHADE NUMBERS
Shielded metal-arc welding	
1/16-, 3/32-, 1/8-, 5/32-inch electrodes	10
Inert-gas metal-arc welding (nonferrous)	
1/16-, 3/32-, 1/8-, 5/32-inch electrodes	11
Inert-gas metal-arc welding (ferrous)	
1/16-, 3/32-, 1/8-, 5/32-inch electrodes	12
Shielded metal-arc welding	
3/16-, 7/32-, 1/4-inch electrodes	12
5/16-, 3/8- inch electroces	14
Atomic hydrogen welding	10-14
Carbon-arc welding	14
Soldering	2
Torch brazing	3 or 4
Light cutting, up to 1 inch	3 or 4
Medium cutting, 1 inch to 6 inches	3 or 5
Heavy cutting, over 6 inches	5 or 6
Gas welding (light), up to 1/8 inch	4 or 5
Gas welding (medium), 1/8 inch to 1/2 inch	5 or 6
Gas welding (heavy), over 1/2 inch	6 or 8

Note: In gas welding or oxygen cutting, there the torch produces a high yellow light, it is desirable to use a filter or lens that absorbs the yellow or sodium line in the visible light of the operation.

A3. MAINTENANCE AND DISINFECTION OF EYE PROTECTORS

A3.1 Maintenance.

A3.1.1 It is essential that the lenses of eye protectors be kept clean. Continuous vision through dirty lenses can cause eye strain, which could possibly result in substandard production by the operator. Daily cleaning of the eye protector with soap and hot water is recommended.

A3.1.2 Replace pitted lenses. Pitted lenses, like dirty lenses, can be a source of reduced vision. They should be replaced periodically. Deep scratches or excessive pitting of lenses are apt to weaken the lenses and cause them to break more readily.

A3.1.3 Replace headbands. Slack, worn-out, sweat-soaked, or twisted headbands do not hold the eye protector in proper position. Visual inspection can determine when the elasticity is reduced to a point beyond proper function.

A3.1.4 Keep goggles in case when not in use. Spectacles, in particular, should be given the same care as one's own glasses, since the frame, nose pads, and temples can be damaged by rough usage.

A3.2 Disinfection. Personal protective equipment which has been previously used shall be disinfected before being issued to another employee. Even when each employee is assigned protective equipment for extended periods, it is recommended that this equipment be cleaned and disinfected regularly. Several methods for disinfecting eye-protective equipment are acceptable. The most effective methods is to disassemble the goggles or spectacles and thoroughly clean all parts with soap and hot water. Carefully rinse all traces of soap and replace defective parts with new ones. Swab thoroughly or completely immerse all parts for 10 minutes in a solution of germicidal deodorant fungicide. Remove parts from solution and suspend in a clean place for air drying at room temperature or with heated air. Do not rinse after removing parts from solution because this will remove the germicidal residue which retains its effectiveness indefinitely. The dry parts or items should be place in clean, dust-proof containers, such as a box, bag or plastic envelope to protect them until re-issue.

A4. FITTING OF GOGGLES AND SPECTACLES

A4.1 Cup Goggles. The first step in fitting cup goggles is to adjust the nose bridge. Both the ball and link-chain bridges of goggles are adjustable to accomodate the individual wearer. Both types of bridges usually have some means for shortening or lengthening. In either case, to shorten or lengthen the bridge, the instructions of the manufacturer should be followed. Chain not needed after adjustment should be cut off. The chain should be insulated to protect the nose of the wearer.

The proper procedure for adjusting headbands is to keep the band loose enough to slip two fingers under it, palm side down, without stretching. Headbands should be worn low and flat and approximately at the base of the skull in order to hold goggles in a comfortable position. Most cup goggles are thinner and slanted away at the lower nasal sides, which makes for comfort as well as easy identification in getting them right side up.

A4.2 Spectacles. The first step in fitting spectacles is to determine the proper eye and bridge sizes. This is done best by using fitting samples and placing the sample spectacle on the nose to arrive at the proper size. The adjustable rocker pads should fit flush against the sides of the nose without allowing the metal bridge of the spectacle to rest on the nose bridge of the wearer. The small metal arms to which the pearloid pads are attached, can be readily adjusted by round nose pliers which are especially designed for this purpose. To fit the temples comfortably over the ears, hold the spectacle firmly in one hand and shape the bow of the temple gradually by drawing it slowly between thumb and forefinger of other hand. Temples should be angled down from frame to ear so that lenses will be perpendicular to the line of vision.

Perscription safety spectacles should be fitted only by qualified optical personnel.

FIRST AID AND THE LAW: LEGAL RESPONSIBILITY
CIVIL DAMAGE AND TEXAS GOOD SAMARITAN LAW

A SPEECH GIVEN BY IVAN R. WILLIAMS, JR.
ASSISTANT ATTORNEY GENERAL OF TEXAS
ON MARCH 17, 1965, TO THE
EMERGENCY FIRST AID CARE AND TRANSPORTATION

SPONSORED BY
TEXAS FIREMEN'S TRAINING SCHOOL,
ENGINEERING EXTENSION SERVICE
TEXAS A&M UNIVERSITY

COLLEGE STATION, TEXAS

H.B. 100, 57th Texas Legislature, Regular Session, 1961, codified as Article 1a, Vernon's Civil Statutes, is popularly known as the Texas Good Samaritan Law.

The provisions of this Act provide as follows:

> "No person shall be liable in civil damages who administers emergency care in good faith at the scene of an emergency for acts performed during the emergency unless such acts are willfully or wantonly negligent; provided that nothing herein shall apply to the administering of such care where the same is rendered for remuneration or with the expectation of remuneration or is rendered by any person or agent of a principal who was at the scene of the accident or emergency because he or his principal was soliciting business or seeking to perform some services for remuneration."

The legislative purpose of the Texas Good Samaritan Law is evidenced by the language of Section 2 of H.B. 100.

Section 2 provides as follows:

> "Sec. 2. The fact that present law could be construed so as to cause one acting as a 'Good Samaritan' to be held liable for his efforts, thereby making certain persons reluctant to render aid to helpless persons in emergencies, creates an emergency and an imperative public necessity..."

It is true that prior to the passage of the Texas Good Samaritan Law, A Good Samaritan who administered emergency care in good faith at the scene of an emergency could be held liable for his efforts in civil damages if such care was negligently administered and an injury was sustained by the person sought to be aided. In the absence of a legal duty to the contrary, there is no obligation at common law for one person to administer emergency care or first aid to another. For example, Article 1150, Vernon's Penal Code, makes it a criminal offense for a motorist to fail to stop and render aid. Under this Article, the so-called "hit and run driver" is prosecuted. Article 1150, Vernon's Penal Code, provides inpart as follows:

> "Whenever an automobile, motorcycle or other motor vehicle whatsoever, regardless of the power by which the same may be propelled, or drawn, strikes any person or collides with any vehicle containing a person, the driver of, and all persons in control of such automobile, motor vehicle or other vehicle shall stop and shall render to the person struck or to the occupants of the vehicle collided with all necessary assistance including the carrying of such person or occupants to a physician or surgeon for medical or surgical treatment, if such treatment be required, or if such carrying is requested by the person struck or any occupant of the vehicle collided with;...Any person violating any provision of this article is punishable by imprisonment in the penitentiary not to exceed five years or in jail not exceeding one year or by fine not exceeding five thousand dollars, or by both such fine and imprisonment."

Prior to the passage of the Texas Good Samaritan Law, the courts recognized that a person who is confronted with an emergency may be left no time for thought or may reasonably be disturbed or excited and so cannot weigh alternative courses of action, but must make a speedy decision which will be based very largely upon impulse or instinct. Consequently, he was not held to the same conduct as one who had an opportunity to reflect, even though it appeared that he made the wrong decision. It was held that his choice could be mistaken and yet prudent. However, this did not mean that any different standard applied in an emergency situation. The conduct that was required was that which was reasonable under the circumstances as it would appear to one who was using proper care. His own judgment or impulse was not the sole criteria and he could be held negligent and liable for civil damages if his actions were unreasonable under the circumstances. The amount or degree of vigilance and caution which was held necessary to reach the required standard of reasonable or ordinary care varied according to the capacity of the person with respect to whom the duty to exercise care existed; and hence in determining whether or not an act resulting in injury to another involved a lack of proper care the ability of the person injured to take of his personal safety was a matter considered. Therefore, the condition of the injured person was important. Such factors as whether the injured person was intoxicated or pregnant were considered by the courts in determining whether the proper care was exercised. Also, the following factors have been considered by the courts: age, intelligence, deafness, impaired eyesight, and state of awareness. Also, in determining whether reasonable care was exercised by a person administering to another in an emergency situation, the "experience" of such person was an important consideration. For example, a physician or any person trained in first aid measures was held to a standard of care commensurate with his training and experience.

The emergency doctrine was applied only where the situation which arose was sudden and unexpected and such as to deprive the person of all opportunity of deliberation.

With regard to liability for ordinary negligent acts of a person rendering emergency care or first aid to another without renumeration or expectation of renumeration, the Texas Good Samaritan Law has apparently repealed the

the preexisting law in this State. Since the Texas Good Samaritan Law has not been construed by the appellate courts in this State, I will attempt to interpret the Act and at the same time propose some questions which arise frome the interpretation and suggest answers to the questions.

(1) The Act speaks of "emergency care." In a 1951 Texas case, an "emergency" was defined as a situation arising suddenly and unexpectedly and not proximately caused by any negligent act of the person in question and which calls for immediate action on his part without time for deliberation.

QUESTION: Under this definition of "emergency," what would be considered emergency care under the Act?

ANSWER: Such acts which are immediately required to preserve the life of the injured person. For example, manual and mechanical resuscitation; application of tourniquets; splints; bandages and compresses. Such acts would not properly include the administering of drugs or narcotics for the purpose of relieving pain or discomfort unless administered by a physician, and even a physician administering such drugs, of course, would be held criminally liable for any severe bodily injury or death resulting to the injured person by any negligent administration of such drugs. Article 1200, Vernon's Penal Code, specifically provides for criminal liability in this regard. Article 1200, Vernon's Penal Code, provides as follows:

> "If any person engaged in the practice of medicine and claiming to be a physician shall by the use of any noxious substance administered in a grossly ignorant manner produce death, or other great bodily injury, he shall be punished for the offense as any other person would be who had given such substance knowing it to be injurious and intending to kill or injure."

(2) The language "at the scene of an emergency" is employed in the Act.

QUESTION: What would be considered by the courts to be the scene of an emergency?

ANSWER: A literal or strict construction would include only the immediate location or situs of the emergency or accident. A more liberal construction would include and provide immunity for ordinary negligence for one administering emergency care or first aid while transporting the injured person from the location of the emergency or accident to a hospital or other location for continued care and treatment. In this regard it would appear that "continuity" of emergency care would be important. It would not be illogical for the courts to hold that if a substantial period of time elapsed from the initial or immediate application of emergency care until a resumption of such, that the later care was not included under the provisions of the Act in that the emergency had passed as that term has been defined and therefore it was not rendered at the "scene of the emergency" and was not "emergency care."

(3) The statute provides that the exemption from liability for civil damages exists unless such acts are "willfully and wantonly negligent."

QUESTION: What is the civil or criminal liability of one whose acts in rendering emergency care are "willfully and wantonly negligent?"

ANSWER: This language is intended as an exception to the immunity from civil liability. What is referred to as willful or wanton negligence as being such negligence which shows a callous disregard for human life. If an act of gross negligence causes an injury which results in the death of the injured party and the subsequent injury is the sole producing cause of death, then the person grossly negligent may be found liable for civil damages for wrongful death under Article 4671, Vernon's Civil Statutes, and Article 4673, Vernon's Civil Statutes. In addition, such individual may be held responsible under the criminal law for first degree negligent homicide under the provisions of Article 1231, Vernon's Penal Code, the violation of which being a misdemeanor punishable by a $1,000 fine and one year in jail. For example, if a person while attempting to render emergency care to a person who he knows has a severely injured back injuries him by bending his back, and the injury subsequently results in the death of the injured party, the negligent person could be held responsible for the death, the person grossly negligent could be found liable for civil damages and in addition might be prosecuted for the lesser offense of assault and batter.

(4) The statute also excludes from civil immunity persons who render "emergency care for remuneration" or the "expectation of remuneration" or any person who was "at the scene of the accident or emergency for the purpose of seeking to perform some service for remuneration."

QUESTION: Who is included within the meaning of this language?

ANSWER: It would not be unreasonable for the courts to hold in construing this part of the Act that a wrecker operator and attendants, ambulance drivers and attendants, or physicians called to the scene of the emergency or accident are not granted immunity under the statute. However, this exclusion would not pertain to policemen, firemen, or other municipal employees present, or to a physician or anyone else who had occasion to be at the scene of an emergency or accident without prior notice thereof as a "Good Samaritan."

I hope that this brief discussion of First Aid and the Law with particular emphasis on the Texas Good Samaritan Law will be of some assistance to you in your work in the future.

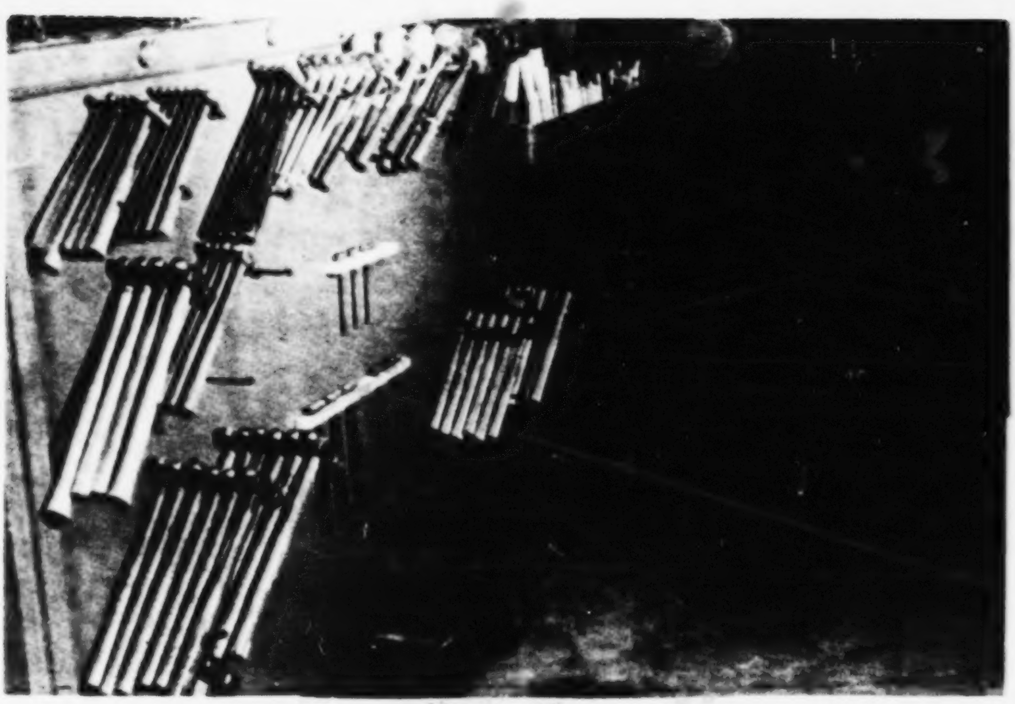

Figure 66

Multiple mounting of tools conserves space but does not facilitate the checking of missing items.

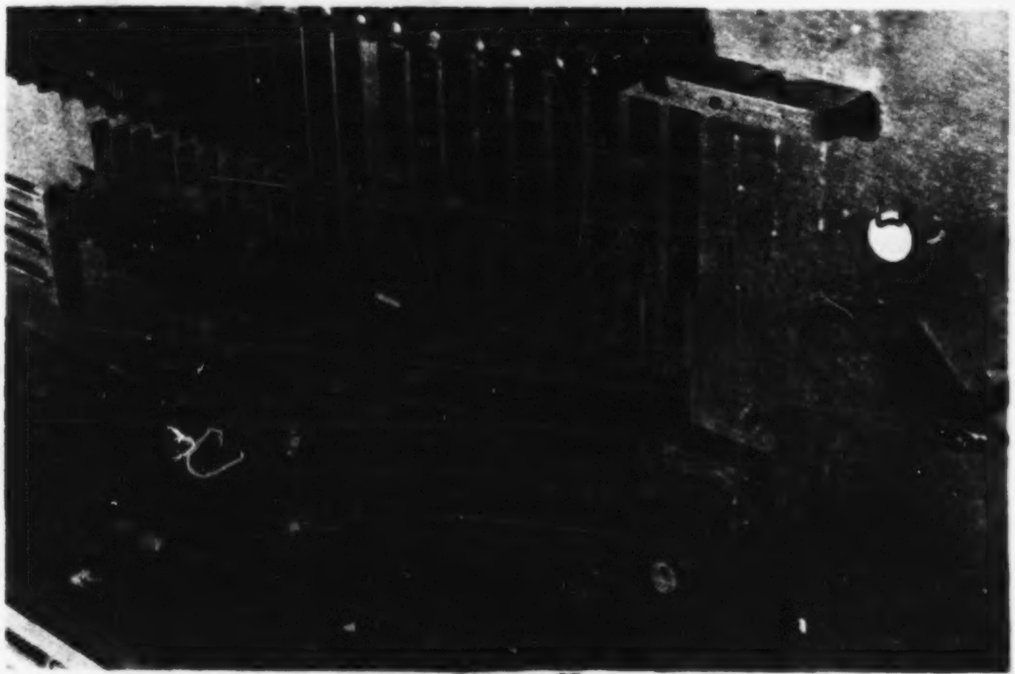

Figure 67

Combination squares kept in sets are less likely to be lost than when separated in the toolroom.

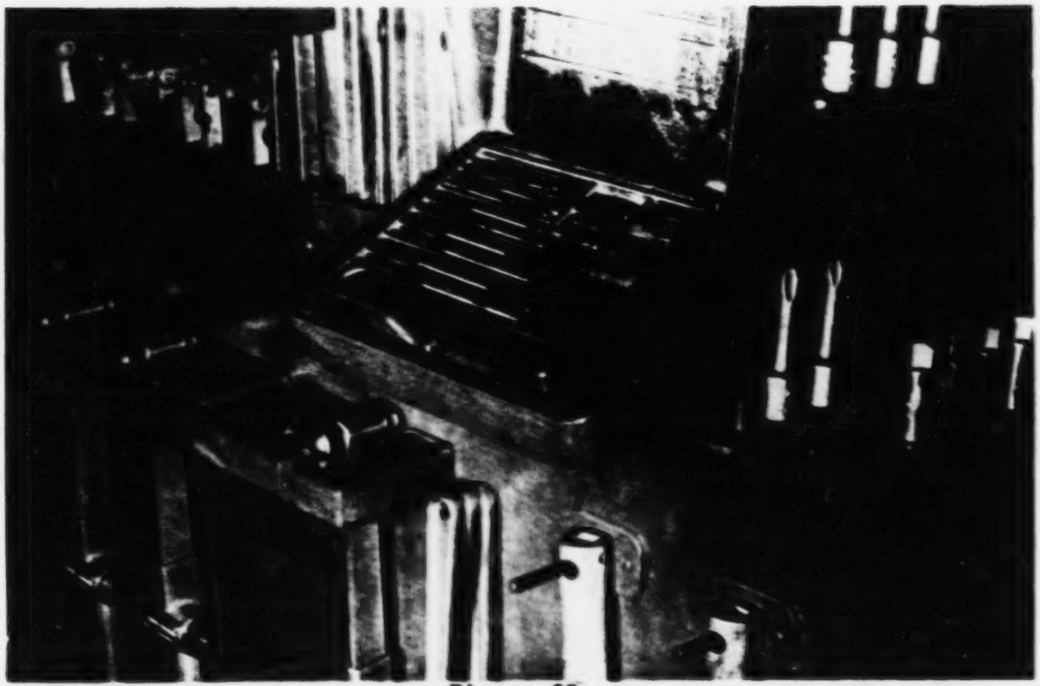

Figure 68

Tools arranged in sets may be kept in the original container when mountings are carefully planned.

Figure 69

Individual tool boards speed the checking in and out of tools for each class.

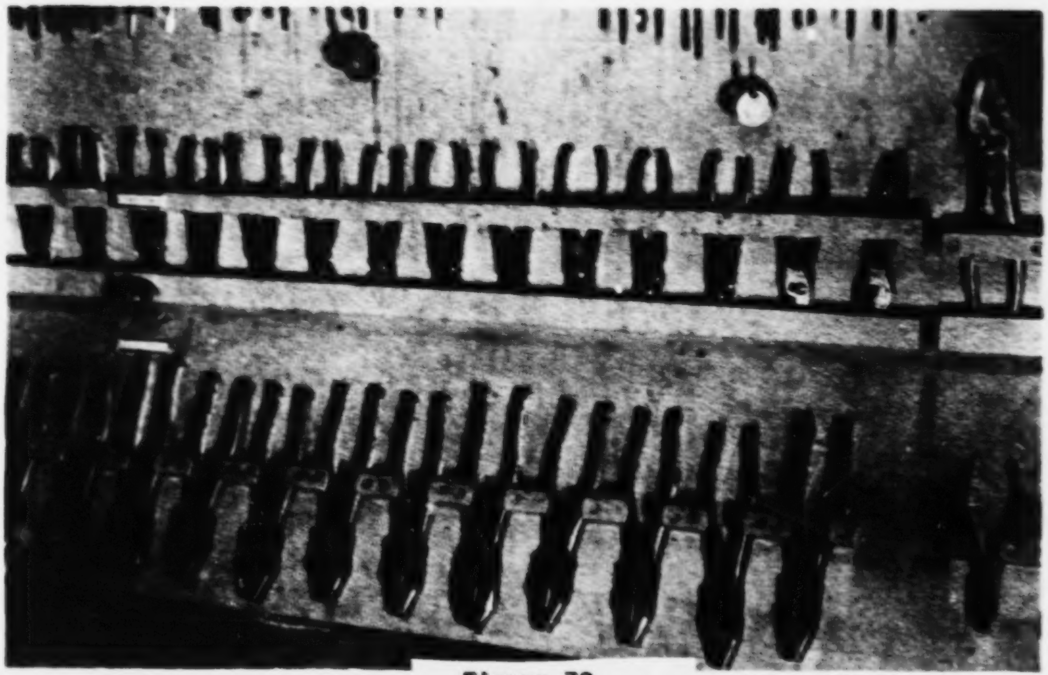

Figure 70

Compactness and orderliness should be prime considerations when arranging toolrooms.

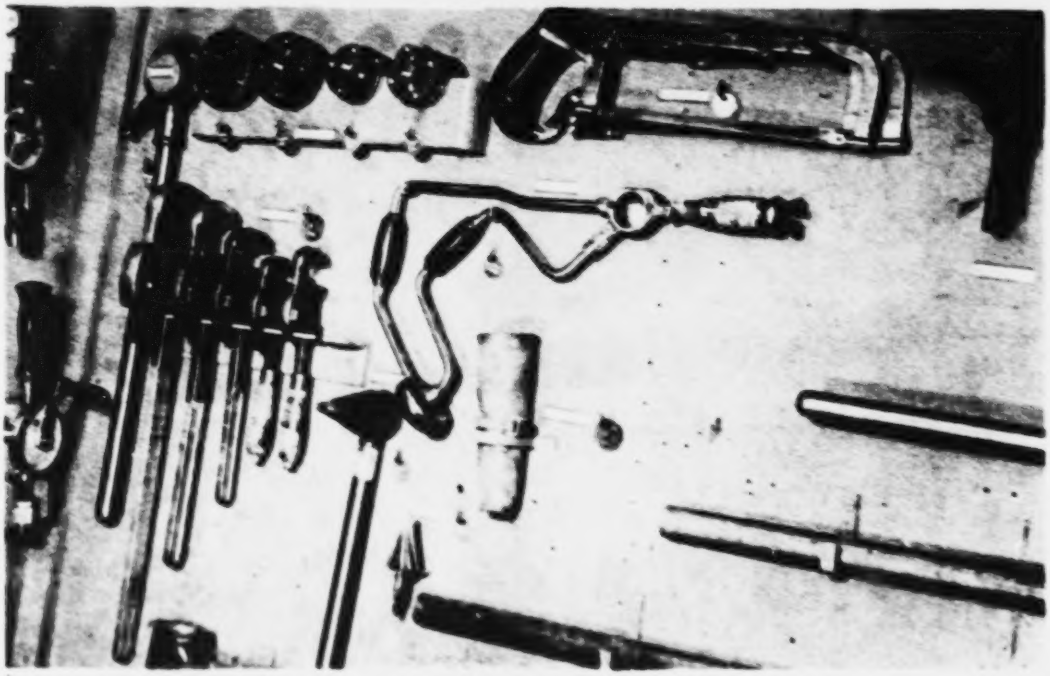

Figure 71

Special planning makes odd-shaped tools appear neat and well arranged.

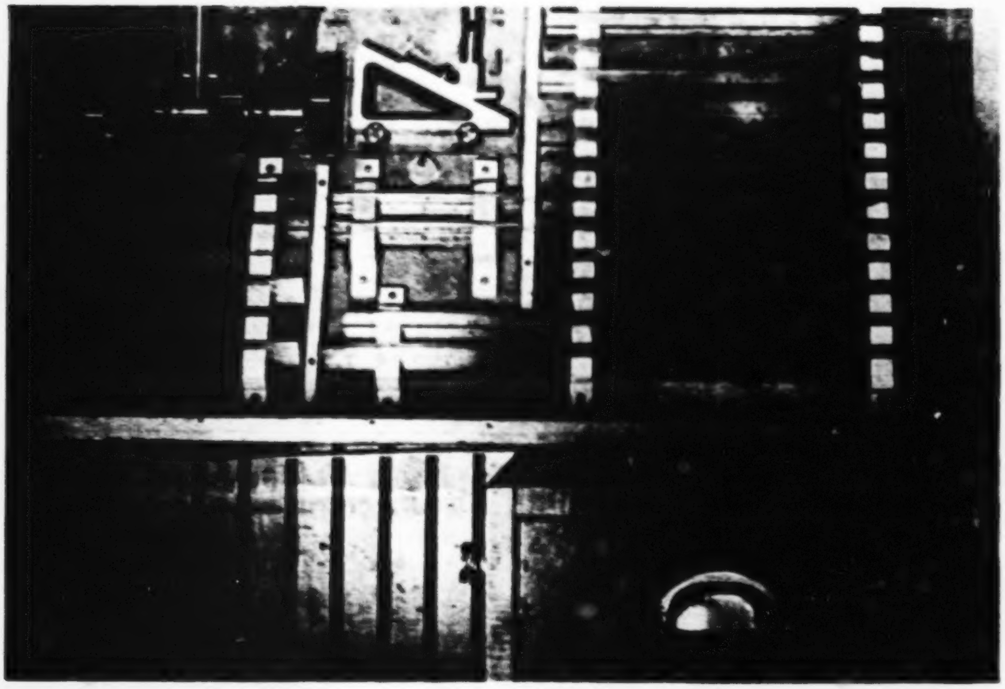

Figure 72

Scales may be easily checked when each item has a separate slot into which it fits.

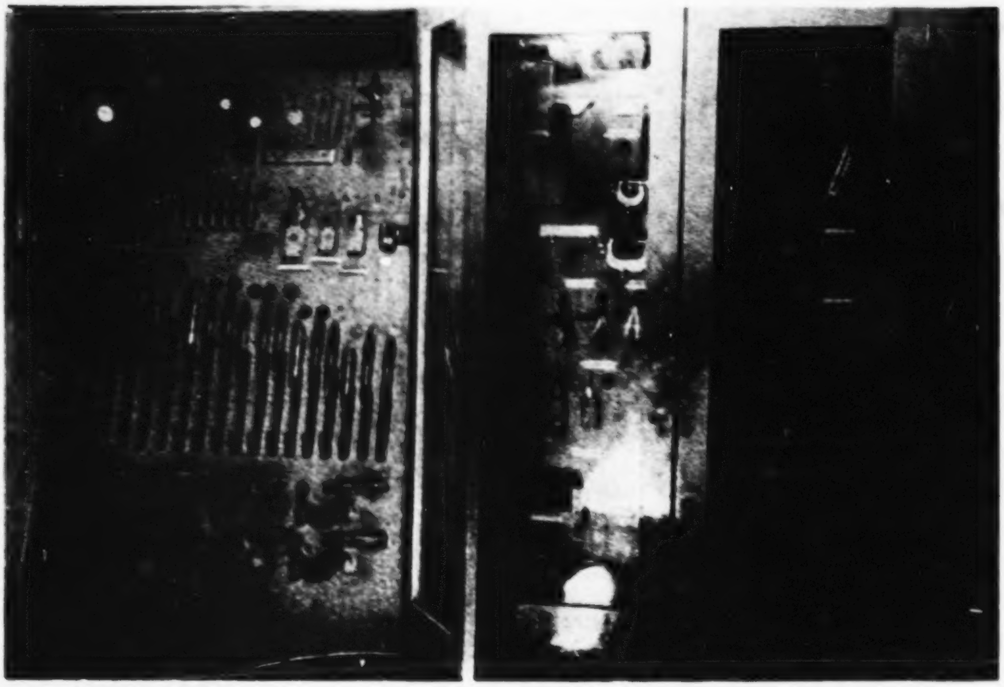

Figure 73

Special consideration should be given to providing separate space to each accurate measuring instrument.

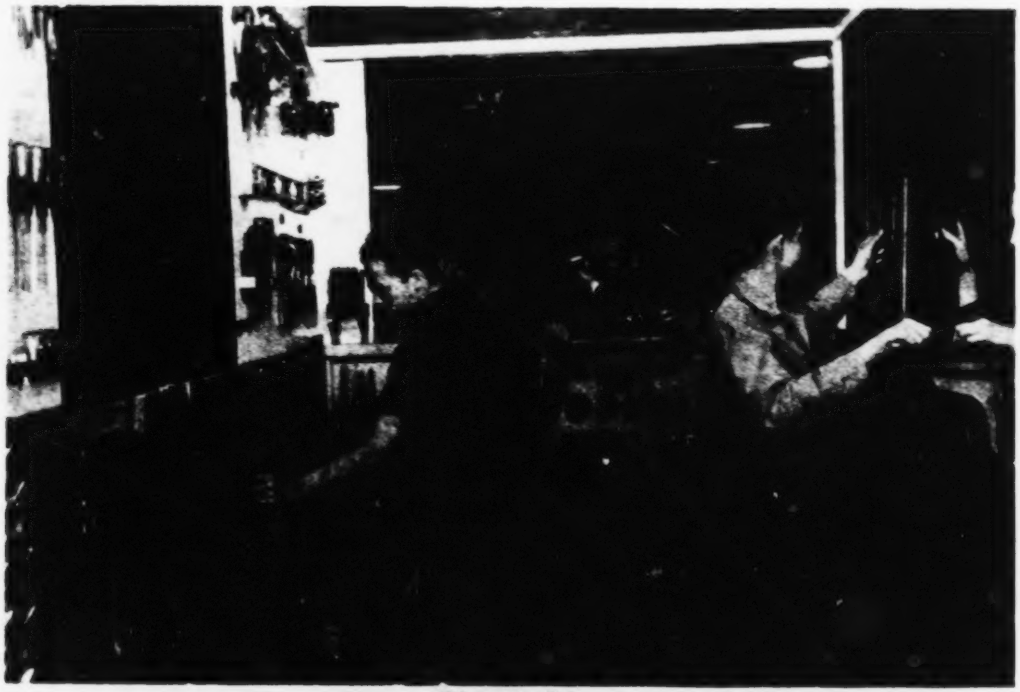

Figure 74

The well-stocked toolroom should be well arranged and kept in an orderly fashion.

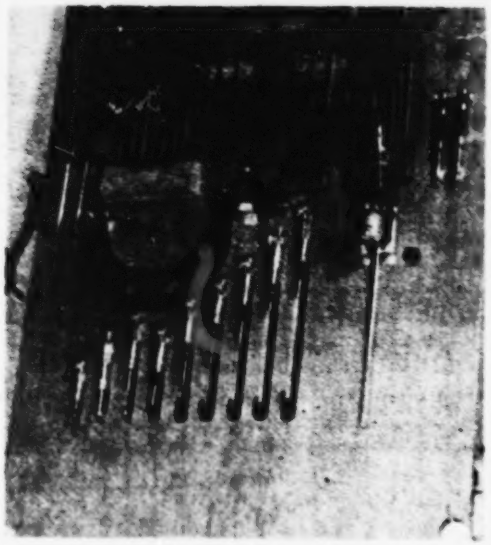

Figure 75

Micrometers, telescoping gages and other fine tools should be mounted so as to prevent damage when removing or replacing.

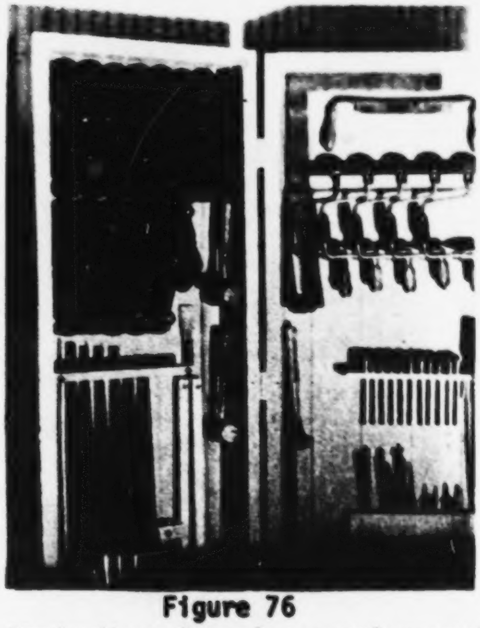

Figure 76

Woodworking tools may be compactly arranged to facilitate checking.

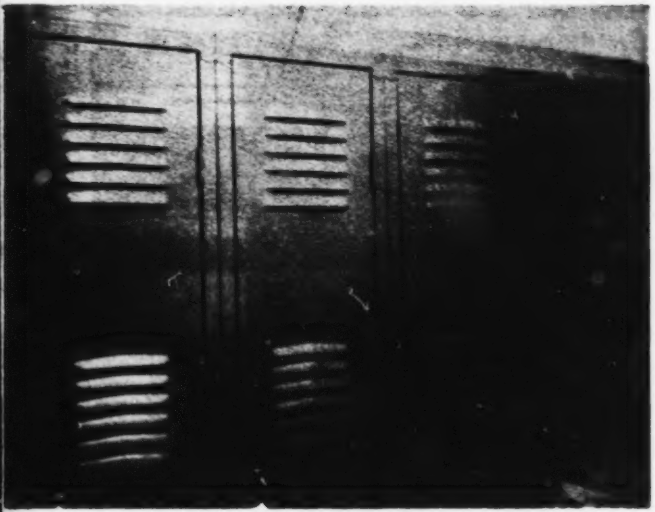

Figure 77

Storage space should be provided for the students' work and their clothing.

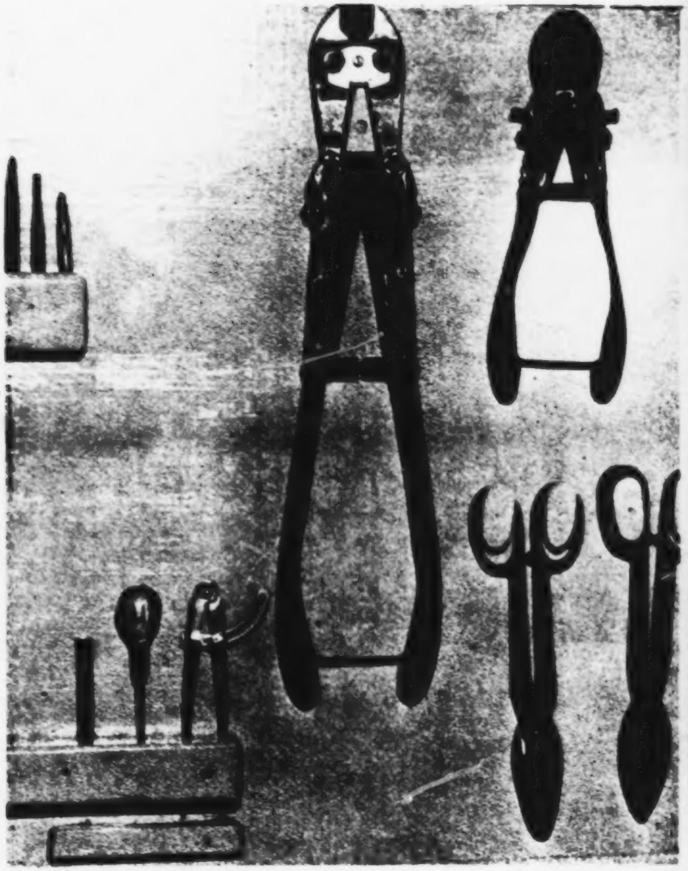

Figure 78

A well-designed, sturdy mounting for heavier tools indicates thoughtful planning.

SAMPLE

____
Name of High School

____
Name of Shop

________ Unit

____________________ Name of Job

Job No. ________

Name ____________________

Date Started __________ Hour __________

Date Completed __________ Hour __________

Time __________ Hours @ __________

Teacher's Check

Plan Sheet ☐

Working Drawing ☐

Material & Procedure ☐

Complete Grade ☐

MATERIAL REQUIRED

1. __________ 2. __________

3. __________ 4. __________

TOOLS REQUIRED

1. __________ 2. __________

3. __________ 4. __________

5. __________ 6. __________

7. __________ 8. __________

9. __________ 10. __________

PROCEDURE

1. ____________________
2. ____________________
3. ____________________
4. ____________________
5. ____________________
6. ____________________
7. ____________________
8. ____________________
9. ____________________

(NOTE: Continue PROCEDURE on another sheet of paper.)

Figure 79

Name________________________________
(Page 2)

PROCEDURE (Cont'd.)

10. ____

11. ____

12. ____

13. ____

14. ____

15. ____

16. ____

17. ____

18. ____

19. ____

20. ____

Working Drawing for________________________________Job No.______
Name of Job

COMPETENCY PROFILE

Instructional Program (Occupational Objective): ______________ School: ______________ Date: ______________
Name: ______________ (Last Middle First) Social Security No. ______________ Phone: ______________
Address: ______________ Age: ______ Date of Birth: ______________ Sex: ______________
Racial/Ethnic Designation: ______________ Special Needs: ______________
In Case of Emergency, Contact: ______________ Address ______________ Home phone ______________ Business phone ______________
OR
Contact: ______________ Address ______________ Home phone ______________ Business phone ______________

Method of Instruction	Grade	Enrollment Date	Withdrawal Date	Completion Date	Total Class Hours	Total Laboratory Hours	Total On-the-job Training Hours	Instructor

ON-THE-JOB TRAINING/WORK EXPERIENCE

Duration of Employment	Job Title	Supervisor's Name	Training Station	Address of Employer	Phone

FOLLOW-UP RECORD

Date	Current Address	Ed. Status	Educational Institution	Educational Objective
		☐ Attending ☐ Not Attending		

Not in Labor Force	Un-employed	Military Status	Employed	Employer	Address	Supervisor	Position	Related to Training	Salary
								☐Yes ☐No	

ELECTRICIAN

JOB COMPETENCIES

DIRECTIONS: Evaluate the student using the rating scale below. Check the appropriate number to indicate the degree of competency. The rating for each of the tasks should reflect job readiness rather than the grade earned in the class.

RATING SCALE:
4 Skilled - can work independently with no supervision
3 Moderately skilled - can perform job completely with limited supervision
2 Limited skill - requires instruction and close supervision
1 No exposure - no experience or knowledge in this area

INSTALLATION OF WIRING

4321
☐☐☐☐ Locates and marks location for service entrance panel.
☐☐☐☐ Locates and marks route for small appliance circuits.
☐☐☐☐ Locates and marks route for general purpose circuits.
☐☐☐☐ Locates and marks route for individual circuits.
☐☐☐☐ Identifies types and sizes of device and outlet boxes.
☐☐☐☐ Determines size of box and number of conductors allowed in a box.
☐☐☐☐ Identifies, selects, and installs switch and handy boxes.
☐☐☐☐ Identifies, selects, and installs outlet boxes.
☐☐☐☐ Determines route and provides access for non-metallic sheathed cable.
☐☐☐☐ Determines need and installs guard strips.
☐☐☐☐ Identifies types, sizes, and characteristics of cable and makes selection of cable.
☐☐☐☐ Unrolls cable and pulls cable through circuit route.
☐☐☐☐ Identifies, selects, and installs cable with connectors and clamps.
☐☐☐☐ Identifies and labels circuits at service entrance panel.
☐☐☐☐ Identifies and selects cable anchors and anchors cable.

JOB ESTIMATION

4321
☐☐☐☐ Makes detailed analysis of plans, specifications, materials, and labor requirements.
☐☐☐☐ Prepares a quick installation cost estimate.
☐☐☐☐ Determines current carrying capacity of circuits.
☐☐☐☐ Identifies and determines number of general purpose circuits.
☐☐☐☐ Identifies and determines number of small appliance circuits.
☐☐☐☐ Identifies and determines number of individual circuits.
☐☐☐☐ Divides wiring into general purpose circuits.
☐☐☐☐ Identifies structural parts of house.

ELECTRIC MOTORS

☐☐☐☐ Determines size and type of electric motor required.
☐☐☐☐ Selects proper mounting base for motor.
☐☐☐☐ Determines motor power factor and motor efficiency.
☐☐☐☐ Identifies and selects motor overload protection devices.
☐☐☐☐ Selects type motor drive and determines drive size.
☐☐☐☐ Troubleshoots, services, repairs, and installs single phase motor.
☐☐☐☐ Troubleshoots, services, repairs, and installs three phase motor.
☐☐☐☐ Troubleshoots and services capacitor start and repulsion type motors.
☐☐☐☐ Troubleshoots, repairs, and installs electric motor controls.
☐☐☐☐ Determines correct motor rotation and changes rotation.
☐☐☐☐ Determines size and type motor belt and installs belt.

Figure 80

BEST COPY AVAILABLE

BEST COPY AVAILABLE

INDEX

A

Accident Liability of Shop Teachers, 92
Accident Report, 12, 103
Advisory Committees, 5
After-Hours Shop Work, 14
Aid, First, 50
Aids Used in Teaching, 37
Aim, 23
Analysis of Vocational Industrial Teacher's Job, 3
Analysis, Simplified, 7
Analyzing Occupations, 6
Appearance of Room, 63
Appendix, 61
Application Stage, 33
Area Specialist, 2
Arrangement of Tools, 12, 131
Arranging Jobs in Learned Order, 27
Asking Devices, 39
Assignments and References, 25
Attendance and Punctuality of Students, 107

B

Bibliography, 62
Bill on Eye Protection, 109
Blueprints, 42

C

Care of Tools and Equipment, 8
Cautions About Observing Practice on the Task, 44
Cautions About Questioning, 39
Cautions About Telling, 37
Chalkboard Sketches, 41
Charging for Materials, 14
Charts and Diagrams, 41
Checking the Course of Study, 22
Check List, Safety, 50
Check Sheets, Instructor's, 104
Check-up Questions, 25
Class Routine, 51
Competency Profile Folders, 59
Computer Materials, 41

C

Conducting Instruction, 4
Conferences, 19
Cooperation and Executive Ability, 107
Correlation With Previous Learning, 24
Course of Study, 22

D

Daily Assignment Plan, 27
Day, The First, 53
Demonstration and It's Essentials, 42
Departmental Plan, 27
Descriptive Title, 23
Determining Instructional Objectives, 21
Devices Used in Teaching, 37
Diagrams, 41
Discipline, 105
Discipling Students, 47
Do and Know Elements, 6
Doing, 43

E

Equipment, Care of, 8
Essentials of a Demonstration, 42
Evaluation, Verification and/or, 35
Examining the Equipment, 20
Eye Protection, 110, 114

F

Facilities for Instruction, 24
Film, 84
Final Functions of Instruction, 4
First Aid, 50
First Aid and the Law, 125
First Day, The, 53
First Month, The, 55
First Semester, The, 55
First Week, The, 54
First Year, The, 56
Five Stages, The, 31

G

Getting Ready to Teach, 19

G

Good Samaritam Law, 125
Good Shop Teacher, 104
Grades, 58
Guidance and Counseling, 107

H

Housekeeping, 106
How to Teach by Demonstration, 43

I

Improvement, Self, 108
Improving Self Professionally, 5
Inspection Report for Shops, 100
Instructional Aids, 24
Instruction, Conduction, 4
Instruction, Final Function of, 4
Instruction, Managing Situation, 4
Instruction, Prepare, 3
Instruction Sheet, 45
Instructor's Check Sheet, 104
Instructor's Job, 3
Instructor's Place, 1
Instructor's Plans, 67
Inventory System, 17, 80

J

Job, Instructor's, 3
Job Plan Sheet, 46, 137
Job Sheet, 46, 74

K

Know Elements, 6
Kit, First Aid, 50

L

Learner's Prerequisites, 24
Lesson Content, 24
Lesson Plans, 22
Lesson Plans, 67
Local Multiple List Textbook Committees, 81

M

Machines, 95

M

Maintenance of Machines, 9
Management, 89
Managing Instructional Situation, 4
Managing Student Activities, 28
Materials and Supplies, 14
Materials and Supplies, A Simple Inventory System, 80
Materials, Charging for, 14
Methods and Procedures, 24
Month, The First, 55
Motion Pictures and Slides, 41
Motion Pictures Showing Suggestions, 83
Multiple List Textbook Committee, 81

O

Objectives of Pre-Employment Shop Classes, 5
Objectives, instructional, 21
Organizing the Shop, 20
Overhead Projector, 81

P

Parental Permit, 97
Performance Test Score Sheet, 98
Personnel Organization, 9
Pictures, Blueprints, and Working Drawings, 42
Pictures, Motion and Slides, 42
Planning the Instruction, 26
Planning the Work, 51
Plans and Devices, 31
Points, Teaching, 25
Practice on the Task, 43
Pre-Employment Shop Classes, 5
Preliminary Accident Reports, 102
Preliminary Meetings and Conferences, 19
Preparation, 31
Prepare Instruction, 3
Preparing to Teach, 19
Presentation, 32
Preventive Discipline, 46
Production Plan, 27
Professional Teacher Organizations, 63
Progress Records, 57, 78, 79
Project Plan, 27

P

Projector, Overhead, 81
Punctuality and Attendance, 107

Q

Questions, Cautions About, 39
Questions, Steps in, 40

R

Recommendations for Film Users, 84
Records and Reports, 56, 106
Records, Progress, 57,78,79
Related Information, Teaching, 61
Reports and Heading Records, 64, 106
Requisitioning Supplies, 16
Review of New Words or Terms, 25
Routine, Class, 51
Rules and Regulations, 11

S

Safety, 47, 97
Safety, Check List, 48
Safety, Supervisor's Check Sheet, 99
Safety in Relation to Performance, 98
Safety, State Bill on Safety, 109
Selection of Textbooks for Vocational
  Industrial Education, 81
Self-Improvement, 108
Semester, The First, 55
Sheet, Instructor's Check, 104
Sheet, Job, 74
Sheet, Job Plan, 46, 142
Sheet, Lesson Plan, 23, 67, 71
Shop, After-Hours Work in, 12
Shop-Class Organization, 9
Shop Equipment, Care of, 8
Shop Inspection Report, 100
Shop Management, 28
Shop Materials and Supplies, 14
Shop Organization, 20
Shop Rules and Regulations, 11
Shop Talks, 48
Showing and Illsutrating, 40
Simple Inventory System for Materials
  and Supplies, 80

S

Simplifies Analysis, 7
Sketches, Chalkboard, 41
Slides and Motion Pictures, 42
Stages in Teaching, 31
Standards for Face and Eye Protection
  Devices, 112
Starting a Class, 52
State Reports, 56
Student Activities, Managing, 28
Student Activities, 24
Student Leadership Responsibility, 89
Students, Attendance and Punctuality, 107
Students, Disciplining, 47
Student's Private Physician Card, 101
Student's Record Certificate on
  Safety Instruction, 94
Student's Safety Statement Form, 96
Study, Checking Courses of, 22
Study, Course of, 22
Summary, 25
Summary or Review, 36

T

Task Sheet, 46, 76
Teacher Activities, 24
Teach, Preparing to, 19
Teacher's Place in the Organization, 2
Teaching Activity, 52
  The First Day, 53
  The First Month, 55
  The First Semester, 55
  The First Week, 54
  The First Year, 56
Teaching Plans and Devices, 31
Teaching Points, 25
Teaching Related Information, 104
Teaching Shop Work, 104
Teaching Tools, 37
Telling, 37
Telling, Cautions About, 38
Terms, Review of New Words, 25
Test Score Sheet, 98
Tools, 131
Trade Analysis, 7

U

Understanding the School System, 19
Use of Student time, 53

V

Verification and/or Evaluation, 35
Verifying the Learning, 25
Vocational Guidance, 107

W

Week, The First, 54
Work, After-Hours Shop, 12
Working Drawings, 42
Work, Planning the, 51

Y

Year, the First, 56